AUSTRALIAN ENERGY REGULATOR

Decision

Powerlink Queensland transmission network revenue cap 2007–08 to 2011–12

14 June 2007

Produced by the ACCC Publishing Unit 06/07.

Contents

Glossary

ACCC	Australian Competition and Consumer Commission
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
APR	Annual planning report
AR	allowed revenue
BPOs	base planning objects
capex	capital expenditure
CHC	CHC Associates
CPI	consumer price index
CQ	Central Queensland
DOME	Department of Mines and Energy (Queensland)
DRP	*Draft statement of principles for the regulation of transmission revenues*, 27 May 1999
Ergon	Ergon Energy
EUAA	Energy Users Association of Australia
kV	kilovolt, (one thousand volts)
MAR	maximum allowed revenue
MW	megawatt, (one thousand kilowatts)
MWh	megawatt hour
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company
NPV	net present value
opex	operating and maintenance expenditure
PB	Parsons Brinckerhoff Associates
PNG	Papua New Guinea
PoE	probability of exceedance
PTRM	post-tax revenue model
RAB	regulated asset base
rules	National Electricity Rules
SEQ	South East Queensland
SQ	Southern Queensland
SWQ	South West Queensland

SRP	*Statement of principles for the regulation of electricity transmission revenues*, 8 December 2004
the current regulatory period	1 January 2002 to 30 June 2007
the new rules	National Electricity Rules, chapter 6A, 16 November 2006
the next regulatory period	1 July 2007 to 30 June 2012
the old rules	National Electricity Rules, chapter 6, 3 April 2006
TNSP	transmission network service provider
WACC	weighted average cost of capital

Summary

Overview

The Australian Energy Regulator (AER), in accordance with its responsibilities under the National Electricity Rules (rules), determines the maximum allowed revenue (MAR) for the prescribed transmission services provided by transmission network service providers (TNSP) in the National Electricity Market (NEM).

On 3 April 2006, Powerlink Queensland (Powerlink) submitted an application for the AER to determine its revenue cap for the period 1 July 2007 to 30 June 2012. Powerlink is a Queensland government owned corporation. It owns, develops, operates and maintains Queensland's only high voltage electricity transmission network.

Powerlink is subject to regulation of its revenues because it is a monopoly service provider. The AER's role as a regulator is to ensure that the claims and assumptions made by a TNSP are supported by evidence. If the AER is reasonably satisfied that the TNSP's claims are valid, its proposal is accepted. In assessing Powerlink's revenue cap application and its supplementary revenue cap proposal, the AER looked beyond the information provided by Powerlink. Other material, including submissions, was reviewed and the assessments of experts were considered in testing Powerlink's claims. The process is essentially aimed at determining the efficiency of the TNSP's proposed allowances.

The AER's final decision has approved nominal smoothed revenues for Powerlink that increase from $537 million in 2007–08 to $815 million in 2011–12. Overall, the AER considered that the allowed revenues provided to Powerlink are sufficient to develop and maintain its network and meet its obligations over the regulatory period. Under the ex ante framework, Powerlink has full operational discretion to allocate its expenditure allowances as it sees fit. It has an incentive to seek more efficient ways of delivering its services in order to maximise its profits while maintaining the service standards that have been set in this decision. These arrangements should provide benefits to users over the longer-term.

The main areas of difference between the AER's draft decision and the final decision are:

- Opening regulated asset base (RAB)—Powerlink's opening RAB as at 1 July 2007 was determined to be $3753 million. This updated amount is lower than the amount of $3781 million contained in the draft decision due to the application of the latest values provided by Powerlink regarding its 2006–07 forecast expenditures for commissioned assets and assets under construction in the RAB roll forward. These values were considered to provide better estimates of the expenditures to be undertaken in 2006–07.

- Forecast capital expenditure (capex) based on Powerlink's original proposal—The capex allowance has been increased from $2032 million ($2006–07) to $2249 million. The increase is primarily due to: load driven capex ($63 million); replacement capex ($108 million); cost accumulation factors ($74 million); and the

transfer of some project costs ($28 million) from the ex ante allowance to contingent projects.

- Forecast capex based on Powerlink's supplementary revenue cap proposal—The AER has allowed an additional $313 million ($2006–07) for capex. This increase is primarily due to: higher input costs for current and future projects ($193 million); higher demand forecasts ($74 million); changes in the probability of network upgrades as a result of the Papua New Guinea (PNG) gas pipeline not proceeding ($44 million); and a new project to satisfy a National Electricity Market Management Company (NEMMCO) requirement ($2 million).

- Total ex ante capex allowance—The total capex allowance is $2629 million ($2006–07), which comprises the sum of the forecast capex allowance based on Powerlink's original proposal ($2249 million), the allowance for the supplementary proposal ($313 million), and other adjustments ($67 million). Powerlink's revised capex proposal was $2918 million. In addition to the ex ante capex allowance, the AER has approved indicative contingent projects totalling $1383 million.

- Forecast operating and maintenance expenditure (opex)—The opex allowance has been increased from $713 million ($2006–07) to $731 million. The increase largely results from the AER allowing Powerlink's claim for an additional self insurance allowance ($3 million) and adjustments to asset base growth and labour cost escalators ($15 million).

Powerlink determines its transmission charges, based on the AER's approved revenues and the pricing principles contained in the rules. The effect of the AER's decision on average transmission charges can be estimated by taking the allowed revenues and dividing them by forecast energy delivered in Queensland. Based on this approach, the AER has estimated that its decision results in an average increase of around 6 per cent per annum (nominal) in transmission charges during 2007–08 to 2011–12.[1] Transmission charges represent approximately 8 per cent on average of end user electricity charges in Queensland.

Under this decision, nominal average transmission charges will increase from around $10.80 per MWh to $14.40 per MWh by the end of the regulatory period. This increase is primarily due to the need for increased investment associated with high levels of forecast demand, ageing assets and high input costs such as construction materials and labour (as a consequence of the commodity/minerals boom), and increased opex due to a growing asset base and high labour costs.

In reaching its final decision, the AER considered that the allowed revenue it has provided for Powerlink is consistent with the rules, in that it provides a fair and reasonable risk-adjusted cash flow rate of return on efficient investment. The decision also provides an acceptable balancing of the interests of Powerlink and users in accordance with the objectives of the rules.

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[1] In real terms, the AER estimated that its decision results in an average increase of around 2.8 per cent per annum in transmission charges over the next regulatory period.

Introduction

On 3 April 2006, Powerlink submitted an application for the AER to determine its revenue cap for the period 1 July 2007 to 30 June 2012 (the next regulatory period). The Australian Competition and Consumer Commission (ACCC) determined Powerlink's revenue cap for a five and a half year period from 1 January 2002 to 30 June 2007 (the current regulatory period).[2]

The Australian Energy Market Commission (AEMC) commenced a review of the rules for regulating electricity transmission networks in the NEM in mid 2005. During Powerlink's preparation of its application, it was recognised that there was a need to provide certainty to Powerlink as to the basis on which the application would be assessed.

The new chapter 6A rules (new rules), which were gazetted on 16 November 2006, include transitional provisions for assessing Powerlink's revenue cap application (clause 11.6.12).[3] In general, the Powerlink transitional provisions require the AER to set Powerlink's revenue cap for the next regulatory period substantially (but not entirely) in accordance with the chapter 6 rules that existed at 3 April 2006 (the old rules) and the AER's *Statement of principles for the regulation of electricity transmission revenues* (SRP).[4] This decision has been prepared in accordance with clause 11.6.12 of the new rules.

On 8 December 2006, the AER made its draft decision on the revenue cap to apply to Powerlink for the next regulatory period.[5] The draft decision approved nominal smoothed revenues for Powerlink that increase from $536 million in 2007–08 to $736 million in 2011–12.

On 15 December 2006, the AER received a supplementary revenue cap proposal (supplementary proposal) from Powerlink seeking an additional capex allowance of $469 million ($2006–07) based on updated information. As the draft decision was made before receiving Powerlink's supplementary proposal, the AER did not take into account this information. The revised total amount of capex being sought by Powerlink was $2918 million. Powerlink also advised the AER that it accepted a number of adjustments made in the draft decision which resulted in a reduction of $165 million.

The AER engaged Parsons Brinckerhoff Associates (PB) as a technical expert to advise it in relation to a number of key aspects of Powerlink's supplementary proposal. Specifically, PB was required to provide its opinion on whether the additional forecast capex sought by Powerlink was reasonable and efficient based on:

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2 ACCC, *Queensland transmission network revenue cap 2002—2006/07: Decision*, 1 November 2001.

3 AEMC, *National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006 No.18*, 16 November 2006.

4 See section 1.3 of the draft decision for a summary of the regulatory framework established under the old rules.
AER, *Compendium of electricity transmission regulatory guidelines*, 22 August 2005.

5 AER, *Powerlink Queensland transmission network revenue cap 2007–08 to 2011–12—Draft decision*, 8 December 2006.

- the revised capital cost estimates for assets under construction and projects that commence in the next regulatory period
- the revised probability of network augmentations as a result of generation associated with the PNG gas pipeline not proceeding during the next regulatory period
- changes in demand forecasts between 2005 and 2006.

PB has provided its advice on these matters and the AER has taken this into consideration in making its decision.

The AER's assessment of Powerlink's revenue cap application involves a number of complex and technical issues. Accordingly, there is a need for the AER to exercise its discretion, after carefully weighing the evidence provided and having regard to the advice of its technical experts. In making its draft decision, the AER sought more than one expert opinion on particular aspects of Powerlink's application, where it was considered that additional technical or specialist advice was required. This process has essentially been followed by the AER in making its final decision. For example, given the majority of submissions highlighted concern with PB's top down approach to establishing Powerlink's replacement capex allowance, the AER has sought a second opinion from CHC Associates (CHC) on PB's findings.

The AER also engaged Access Economics to revise its labour cost forecasts and NERA Economic Consulting to provide advice on hedging costs associated with interest rate risk. The AER is releasing its consultants' reports at the same time as the final decision and they should be read together.

This final decision sets out the AER's consideration of Powerlink's supplementary proposal and substantive new material raised by submissions in relation to the following issues:

- the opening value of Powerlink's RAB as at 1 July 2007 and past capex
- Powerlink's capex allowance for the next regulatory period
- Powerlink's opex allowance for the next regulatory period
- the cost of capital for Powerlink
- the service standards incentive scheme applied to Powerlink.

Each of these matters is summarised below and discussed in detail in the relevant chapters. Except as specified in this final decision, the AER has maintained its conclusions set out in the draft decision.

Opening regulated asset base and past capital expenditure

Draft decision

In the draft decision, the AER determined that Powerlink's expenditures of $1165 million on commissioned projects during the current regulatory period and $488.5 million of its assets under construction at the end of the current regulatory period were prudent (exclusive of finance during construction, or FDC). Based on the regulatory rate of return specified in the ACCC's 2001 revenue cap decision, the AER provided Powerlink with allowances for FDC of $119 million for its commissioned projects and $24 million for its asset under construction. In accordance with its roll forward methodology, the AER determined Powerlink's opening RAB to be $3781 million for the next regulatory period (as at 1 July 2007).

The AER noted in its draft decision that Powerlink was required to advise it on the status of certain reviewed projects, provide an updated forecast value of assets to be commissioned in 2006–07, and provide an updated forecast of expenditure to be incurred for assets under construction in 2006–07.

Powerlink has provided information on the status of certain reviewed projects. It has also provided updated forecasts for the amount of assets to be commissioned in 2006–07 and expenditure to be incurred for assets under construction in 2006–07.

Conclusion

Based on the updated information provided by Powerlink, the AER has concluded that an amount of:

- $1146 million in relation to commissioned assets during the current regulatory period is prudent and should be included in its RAB
- $489.4 million in relation to assets under construction at the end of the current regulatory period is prudent and should be included in Powerlink's RAB.

The updated information provided by Powerlink also required the AER to revise its FDC allowances for Powerlink to $117 million for commissioned projects and $23 million for assets under construction.

Based on the updated values for commissioned assets and assets under construction, the AER's application of the roll forward methodology has determined that Powerlink's opening RAB is $3753 million for the next regulatory period (as at 1 July 2007). The RAB roll forward calculations are set out in table 1.

Table 1 Powerlink's opening RAB for the next regulatory period ($m, nominal)

	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07[1]
Opening RAB	2276.87	2394.51	2553.16	2680.32	2852.56	3007.53
2001 decision capex (adjusted for actual CPI)	155.24	180.12	190.79	233.26	202.37	93.35
CPI adjustment on opening RAB	66.92	82.39	50.59	63.24	85.09	73.26
Straight-line depreciation (adjusted for actual CPI)	–104.53	–103.85	–114.23	–124.26	–132.50	–140.36
Closing RAB	2394.51	2553.16	2680.32	2852.56	3007.53	3033.78
Add: prudent capex over the 2001 decision allowance[2]						206.17
Add: prudent assets under construction at 30 June 2007						512.89
Opening RAB at 1 July 2007						3752.83

[1] Updated with actual CPI for 2006–07 (based on updated forecasts of commissioned assets and assets under construction).
[2] The cash values for disposal of assets have been deducted from capex.

Forecast capital expenditure

The AER has determined a forecast capex allowance for Powerlink based on an assessment of its original capex proposal and the supplementary proposal.[6] The AER reviewed issues relating to Powerlink's original capex proposal separately from its consideration of Powerlink's supplementary proposal.

Draft decision

In the draft decision, the AER provided Powerlink with a forecast capex allowance of $2032 million ($2006–07) for the next regulatory period. This resulted in an average annual capex allowance of $406 million. The AER also approved contingent projects with a total indicative cost of $890 million. Submissions on the draft decision were received from Powerlink and other interested parties. Issues raised in submissions related to the level of load driven expenditure, replacement expenditure, security and business information technology (IT) expenditure, cost accumulation factors, and contingent projects.

Conclusion on forecast capex based on Powerlink's original proposal

The AER has considered the issues raised in submissions and where appropriate has sought further advice from its consultants. The AER has maintained the positions it took in the draft decision on the following areas:

- Security and compliance expenditure—based on PB's advice, the AER has decided to reduce Powerlink's security and compliance expenditure proposal by $13 million ($2006–07) during the next regulatory period by deferring some expenditure associated with a transmission line security upgrade project.

[6] Powerlink's supplementary proposal was received by the AER after the AER had made its draft decision.

- Business IT expenditure—based on PB's advice, the AER has decided to reduce Powerlink's business IT expenditure proposal by $4.1 million ($2006–07) to ensure that Powerlink's proposed allowance for 2009–10 to 2011–12 is more aligned with longer-term average expenditures.

The AER, however, has changed its positions from those contained in the draft decision on the following areas:

- Load driven expenditure—taking into account the advice of its consultants and the additional information contained in submissions, the AER has decided to increase Powerlink's forecast capex by $63 million for load driven projects.

- Replacement expenditure—the AER has increased Powerlink's forecast replacement expenditure by $108 million ($2006–07) for a number of reasons including information provided by Powerlink and advice from its consultants.

- Cost estimation risk factor—the AER has determined that Powerlink has reasonably addressed the concerns raised in the draft decision. It therefore concluded that it is reasonable to allow Powerlink's proposed cost estimation risk factor of 2.6 per cent be applied to its forecast capex estimates to reflect the inherent risks of estimating project costs.

- S-curves adjustments—the AER considered that there is evidence that Powerlink has been experiencing increased lead times for key transmission plants because of tight supply conditions. The AER has decided that the two adjusted S-curves developed by Evans and Peck for line and substation projects were more robust than Powerlink's adjusted S-curves, and that these should be applied by Powerlink in developing its forecast capex.

Overall, the AER has determined an efficient forecast capex allowance for Powerlink of $2249 million based on an assessment of its original capex proposal. This compares with the draft decision which contained an ex ante allowance of $2032 million. Table 2 sets out Powerlink's original capex proposal and the adjustments made by the AER to arrive at its conclusion on an ex ante capex allowance. The total adjustments represent a reduction of $200 million over the next regulatory period compared to Powerlink's original forecast capex proposal.

Table 2 AER's conclusion on Powerlink's forecast capex allowance based on the original proposal ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's capex proposal	546.31	543.02	456.10	466.49	437.32	2449.24
Adjustments resulting from detailed project reviews[1]	–21.65	–66.51	3.61	16.89	–13.23	–80.90
Adjustment to replacement expenditure	–	–	–0.19	–0.73	–2.01	–2.93
Adjustment to undergrounding costs[2]	–10.36	–14.08	–13.46	–6.22	–69.76	–113.88
Transfer of M50++ to contingent projects[2]	–1.25	–13.66	–4.16	2.37	1.44	–15.26
Adjustments to cost accumulation factors	14.41	4.17	5.73	–24.13	12.34	12.52
AER's total adjustments	–18.84	–90.08	–8.47	–11.82	–71.22	–200.44
AER's ex ante capex allowance	527.47	452.94	447.63	454.67	366.10	2248.80

[1] These adjustments relate to load driven, security and compliance, and non-network projects.
[2] These adjustments involve the removal of probability weighted expenditure from the ex ante allowance. This is consistent with the draft decision.

The AER reviewed submissions and additional information provided by Powerlink about contingent projects and their triggers, and has decided that:

- The transmission works associated with the Tugun desalination plant should be included as a contingent project with an indicative cost of $73 million.
- Provision should be made for a contingent project relating to the construction of additional desalination plants in South East Queensland (in addition to Tugun desalination plant).
- There should be no additional trigger for the South East Queensland augmentation contingent project.
- The trigger for the Gladstone industrial development project should be a 250 MW point load development in Gladstone, which was not included in the 2006 demand forecasts. No provision has been made for an additional trigger for this contingent project relating to generation developments. The indicative cost of this contingent project remains unchanged from the draft decision.
- A contingent project relating to the announcement of a significant change in generation patterns in Southern Queensland due to drought and other factors should be included as a contingent project with an indicative cost of $420 million.

In summary, the AER has approved 11 contingent projects for Powerlink with a total indicative cost of $1383 million.

Powerlink's supplementary proposal

On 15 December 2006, the AER received a supplementary proposal from Powerlink seeking an additional capex allowance of $469 million ($2006–07) based on updated information. The revised total amount of capex sought by Powerlink is $2918 million. Powerlink also advised the AER that it accepted a number of adjustments made in the draft decision which resulted in a reduction of $165 million.[7]

Powerlink's supplementary proposal identified the need for additional capex based on:

- higher input costs for assets under construction and future capital projects
- changes in the probability of network upgrades due to the generation associated with PNG pipeline not proceeding within the next regulatory period
- advancement in the timing of some forecast capex projects due to higher demand forecasts
- an additional high speed monitoring (HSM) project to satisfy a NEMMCO requirement.

Conclusion on supplementary proposal

The AER engaged PB as a technical expert to review a number of key aspects of Powerlink's supplementary proposal. The AER has taken account of this advice in forming its conclusion on the supplementary proposal.

Cost increases for assets under construction

PB found that prices for base metals (such as copper and aluminium) and labour costs had risen from earlier cost estimates, and had affected Powerlink's projects currently under construction. The AER has accepted PB's recommendation that the increase in forecast capex on projects currently under construction was reasonable. It has therefore approved an additional amount of $155 million ($2006–07) for capex due to input cost increases associated with Powerlink's assets under construction.

Cost increases for future projects

PB found that the unit costs (base planning objects, or BPOs) used to develop Powerlink's original forecast capex proposal more appropriately reflected the costs Powerlink was likely to experience over the next regulatory period. It therefore did not support Powerlink's proposal to increase its forecast capex allowance based on revised BPOs. The AER's analysis of publicly available information supported PB's view that input costs, particularly high metal prices, are expected to fall over the next regulatory period. The AER considered that the BPOs used in Powerlink's original revenue cap application provide a more reasonable base cost estimate for Powerlink's future capex projects.

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7 The draft decision adjustments included in Powerlink's revised capex proposal are: undergrounding costs transferred to contingent projects; Central Queensland–South Queensland projects review; transfer of M50++ sub-theme set to contingent projects; and use of specific locality factors for capacitor bank projects.

However, recognising the uncertainty associated with forecasting and the possibility that high metal prices could persist a little longer than expected, the AER has allowed Powerlink to use the revised BPOs for estimating the cost of future projects that commence construction in 2007–08. For future projects in the remaining four years of the next regulatory period, it is appropriate to maintain the use of the cost estimates based on the BPOs contained in Powerlink's original revenue cap application. Following a request from the AER, Powerlink advised that the AER's conclusion would result in an additional $37 million to capex due to input cost increases for future projects.

Generation from PNG gas pipeline project

PB found that it was reasonable that Powerlink had modified the probability of the PNG theme set to zero in determining its probability weighted forecast capex. However, it recommended that the final adjustment to the probabilities, aimed at maintaining some characteristics of the original PNG theme set, was unnecessary and should not be made.

The AER has agreed with PB that this final adjustment compromises the outcomes of Powerlink's review of the PNG theme set because it is inconsistent with the methodology used in the original capex proposal. Accordingly, the AER has accepted PB's recommendation to remove the final adjustment factor to maintain the integrity of the probabilistic model. Following a request from the AER, Powerlink advised that the AER's conclusion would result in an additional $44 million to capex due to the impact of revised probability of generation from the PNG gas pipeline.

2006 demand forecasts

PB found that it was reasonable for Powerlink to review its transmission development plans due to the higher 2006 demand forecasts and that this review had been undertaken systematically and rigorously. The AER considered that Powerlink's approach to reviewing its capex requirements is reasonable.

A number of projects affected by the higher demand forecast were reviewed to determine whether the change in timing was appropriate. Based on advice from PB and CHC, the AER has decided that Powerlink's proposed increase in capex for higher demand forecasts should be reduced for the inefficient advancement of one project. The AER has also accepted Powerlink's advice that its proposed capex increase should be reduced for the incorrect application of a high-growth scenario. Following a request from the AER, Powerlink advised that the AER's conclusion would result in an additional $74 million to capex due to the impact of higher demand forecasts.

HSM project

Based on information provided by NEMMCO and Powerlink, the AER considered that the project, with a cost of $2.35 million, is efficient and therefore should be included in Powerlink's forecast capex allowance.

Conclusion

Based on its assessment of Powerlink's supplementary proposal, the AER has determined that Powerlink's forecast capex allowance should be increased by $313 million. The expenditure profile of this increased capex is set out in table 3.

Table 3 AER's conclusion on supplementary proposal ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal[1]	153.68	145.04	16.05	101.21	53.24	469.23
Assets under construction–input costs	–0.16	–	–	–	–	–0.16
Future projects–input costs	–	–3.80	–24.57	–32.71	–27.06	–88.14
PNG–revised probability	–2.88	–2.83	–3.17	–2.84	–1.21	–12.92
Demand forecast	–7.94	2.53	3.45	–53.96	0.90	–55.02
AER's total adjustments	–10.98	–4.10	–24.29	–89.51	–27.36	–156.24
AER's conclusion	142.70	140.94	–8.24	11.70	25.87	312.99

[1] The proposed capex increase of $469 million included expenditure associated with the M50++ sub-theme and undergrounding costs.

Conclusion on total ex ante allowance

The AER has determined that Powerlink's ex ante allowance should be $2249 million ($2006–07) based on an assessment of the proposed capex contained in Powerlink's original application. In addition, based on its review of Powerlink's supplementary proposal, the AER has concluded that this allowance should be increased by $313 million.

Further adjustments are required to be made to Powerlink's supplementary proposal to ensure consistency with the AER's conclusions on Powerlink's original capex proposal.[8] Powerlink also informed the AER that since the supplementary proposal, a number of adjustments had been made for the timing of projects based on latest information.[9] Powerlink has advised that these adjustments increase the ex ante allowance by $67 million. The AER reviewed these adjustments and found them to be appropriate.

The AER's overall conclusion on Powerlink's capex for the next regulatory period is an ex ante allowance of $2629 million. Table 4 sets out the AER's conclusion on Powerlink's ex ante allowance. The AER has also approved an indicative contingent project allowance of $1383 million.

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8 The adjustments included the AER's conclusions on load-driven projects, the adjustment to expenditure from the AER's conclusion on the M50++ sub-theme and undergrounding expenditure, and cost accumulation factors. Adjustments for CPI changes to the capex were also made.

9 Powerlink advised that a number of projects have received Powerlink Board approval (or relevant delegated authority) subsequent to the supplementary proposal. Powerlink also included an adjustment for latest timing information for a number of projects under construction.

Table 4 AER's conclusion on total ex ante allowance ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's revised proposal	699.99	688.06	472.15	567.70	490.56	2918.46
AER's conclusion on original capex proposal	527.47	452.94	447.63	454.67	366.10	2248.80
AER's conclusion on supplementary proposal	142.7	140.94	–8.24	11.7	25.87	312.99
Other adjustments	21.88	45.84	–17.76	6.15	10.64	66.74
AER's overall conclusion	692.04	639.72	421.63	472.52	402.62	2628.53

In the draft decision, the AER noted that an assessment of Powerlink's ability to deliver its forecast capex program was needed because under the capex incentive framework, a TNSP is able to retain, within the regulatory period, the excess return on and of capital associated with a lower expenditure than the approved capex allowance. The AER, in light of this review, considered that Powerlink had the potential to deliver its amended capex profile.

The AER's amended capex allowance in this final decision is materially higher than the draft decision. While acknowledging that the amended capex program is challenging—primarily in the first two years of the next regulatory period—the AER still considers that overall Powerlink has the potential to be able to deliver it for the following reasons:

- it is delivering a significantly higher level of capex in the final year of the current regulatory period
- the initiatives undertaken by Powerlink to ensure it can deliver the increased capex appear to be effective
- a significant proportion of the higher capex is due to higher input costs as opposed to additional physical work
- adjustments to cost accumulation factors such as revised labour escalators and S-curves should assist Powerlink in delivering the amended capex program.

Cost of capital

Draft decision

In the draft decision, the AER provided Powerlink with a nominal vanilla weighted average cost of capital (WACC) of 8.76 per cent. In accordance with clause 11.6.12(d) of the Powerlink transitional provisions, the AER determined the WACC by reference to the specified values, methodologies and benchmarks contained in the new chapter 6A rules. Issues relating to debt raising and refinancing costs, interest rate hedging costs, equity raising costs and the inflation forecast were raised in response to the draft decision.

Conclusion

The AER's conclusion is to provide Powerlink with a nominal vanilla WACC of 8.76 per cent. The WACC parameter values are set out in table 5. The AER has not updated the WACC in this final decision because the averaging period for the bond rates was fixed and the other parameters were prescribed by the new rules.

Table 5 Comparison of cost of capital parameters

Parameter	AER's conclusion	Powerlink's proposal[1]
Nominal risk-free rate	5.68 %	5.28 %
Real risk-free rate	2.45 %	–
Expected inflation rate	3.15 %	2.91 %
Debt margin	1.14 %	1.10 %
Cost of debt	6.82 %	6.38 %
Market risk premium	6.00 %	6.00 %
Gearing	60 %	60 %
Value of imputation credits (gamma)	0.50	0.50
Equity beta	1.00	1.00
Nominal post-tax return on equity	11.68 %	–
Post-tax nominal WACC	7.01 %	–
Pre-tax real WACC	5.95 %	–
Nominal vanilla WACC	8.76 %	8.34 %

[1] Powerlink's proposal in April 2006.

The AER has further considered the issues raised in submissions and has decided to maintain the positions it took in its draft decision, specifically to:

- provide Powerlink with a benchmark allowance of 8.1 basis points per annum for debt raising costs
- not allow Powerlink an additional amount for debt refinancing and interest rate risk management costs
- not provide Powerlink with an allowance for equity raising costs associated with its 2001 opening RAB
- apply a forecast inflation rate of 3.15 per cent per annum based on market determined nominal and indexed Commonwealth government securities yields.

However, the AER has decided to change its position from that contained in the draft decision on equity raising costs associated with Powerlink's forecast capex. The AER has allowed Powerlink a benchmark amount of $8.6 million for equity raising costs associated with its capex over the next regulatory period.

Operating and maintenance expenditure

Draft decision

The draft decision provided Powerlink with an opex allowance of $713 million ($2006–07) during the next regulatory period. This resulted in an average annual opex allowance of $143 million. The AER received submissions on the draft decision from Powerlink and other interested parties. Issues raised in submissions included labour and maintenance materials escalators, asset growth cost drivers, vegetation management, self insurance allowance, efficiency benefit sharing and benchmarking measures.

Conclusion

The AER has considered the issues raised in submissions and has obtained further advice from its consultants. The AER has maintained the positions it took in the draft decision on the following areas:

- Maintenance materials cost escalator—based on PB's advice and a review of available information, the AER has applied the industry standard of using the consumer price index (CPI) to escalate Powerlink's maintenance materials costs.

- Condition based maintenance—based on PB's advice, the AER has decided that condition based maintenance costs for new assets should be held constant over the next regulatory period.

- Land (vegetation) management—the AER has adopted the vegetation management escalators proposed by PB.

The AER, however, has decided to change its positions from that contained in the draft decision on the following:

- Labour cost escalators—the AER has decided to apply the revised Access Economics forecasts of labour costs for Queensland (2008–09 to 2011–12), which were based on a revised macroeconomic model and took into account the impact of the mining, construction and utilities sectors on the cost of labour employed by Powerlink.

- Self insurance allowance—the AER has accepted Powerlink's revised self insurance proposal.

An adjustment has also been made to Powerlink's opex allowance to reflect the amended capitalisation profile associated with the higher forecast capex allowance.

Powerlink proposed allowances for several financing costs, including debt management and equity raising costs. The AER has provided Powerlink with an adjusted benchmark allowance for debt and equity raising costs but has not provided allowances for debt refinancing and interest rate risk management costs. The AER has also considered Powerlink's alternative capex efficiency claim in relation to a Gold Coast transmission reinforcement project. It has not accepted Powerlink's alternative capex efficiency claim in relation to this project.

Based on the above adjustments, the AER has determined an opex allowance increasing from $141 million in 2007–08 to $150 million in 2011–12 ($2006–07). This represents a total allowance of $731 million during the next regulatory period as shown in table 6. The AER's conclusion results in an average annual opex allowance of $146 million and is higher than the draft decision due to increases in self insurance, asset base growth and labour cost escalators.

Table 6 AER's conclusion on Powerlink's opex allowance ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's controllable opex	113.11	119.48	126.52	135.61	140.12	634.85
Capex efficiencies	7.70	7.70	7.70	7.70	7.70	38.50
Debt management costs	4.89	4.20	4.28	4.40	3.79	21.56
Equity raising costs	2.47	2.47	2.47	2.47	2.47	12.35
Network support costs	24.03	17.34	22.15	8.22	8.30	80.04
Powerlink's total opex	152.20	151.19	163.12	158.40	162.38	787.30
AER's controllable opex allowance	112.50	119.44	124.73	131.79	135.84	624.31
Capex efficiencies	3.19	3.19	3.19	3.19	3.19	15.94
Debt raising costs[1]	1.77	2.03	2.26	2.38	2.52	10.96
Equity raising costs[2]	–	–	–	–	–	–
Network support costs[3]	24.03	17.34	22.15	8.22	8.30	80.04
AER's total opex allowance	141.49	142.00	152.33	145.58	149.85	731.25

[1] See section 5.2 for further discussion.
[2] An allowance for benchmark equity raising costs is included in Powerlink's RAB. See sections 5.4 and 5.5 for further discussion.
[3] The network support costs are forecasts. Network support costs may be subject to additional pass through during the next regulatory period.

Service standards

Draft decision

The draft decision contained a service standards incentive scheme to apply to Powerlink for the next regulatory period. The scheme included six performance measures with associated financial incentives aimed at encouraging service improvements. Individual performance values, including target, cap and collar values, weightings, and measure definitions were also established as part of the scheme. The draft decision was based on the old rules and the *Service standards guidelines*, released on 12 November 2003.

The AER received a number of submissions regarding the service standards incentive scheme contained in the draft decision. Key issues raised in these submissions were the revenue neutrality of targets, the period of historical averages, deadbands and loss of supply events measures, exclusions, and the nature of the service standards scheme applied to Powerlink.

Conclusion

The AER has considered the submissions and obtained further advice from PB. Based on its review of the material, the AER has made some adjustments to the service standards incentive scheme contained in the draft decision and has set revised values to apply to Powerlink in the next regulatory period. These adjustments include:

- revising the performance target, cap and collar values for 2006 performance information
- rounding the target values for loss of supply greater than 0.2 system minutes and loss of supply greater than 1 system minute to the nearest whole number—i.e. to five and one events respectively. Cap and collar values for these measures have also been adjusted.

The revised values to apply to Powerlink are set out in table 7. In accordance with the old rules and the service standards guidelines, the AER has determined a service standards incentive scheme that includes six performance measures and limits the revenue at risk to one per cent of Powerlink's allowed revenue.

Table 7 AER's conclusion on service standards incentive weightings and values

Measure	Unit	Weighting (%)	Max. penalty (collar)	Target	Max. bonus (cap)
Circuit availability—critical elements	%	15.5	98.01	99.07	99.60
Circuit availability—non-critical elements	%	8.5	97.81	98.40	98.99
Circuit availability—peak hours	%	15.5	97.53	98.16	98.80
Loss of supply > 0.2 system minutes	Number	15.5	8.0	5.0	2.0
Loss of supply > 1.0 system minutes	Number	30.0	3.0	1.0	0.0
Average outage duration (capped at 7 days)	Minutes	15.0	1627	1033	439

Maximum allowed revenue

Draft decision

The rules require the AER to determine a TNSP's MAR. In determining the revenue for each year of the regulatory period, the AER adopts the accrual building block approach:

$$\text{Revenue} = \text{return on capital} + \text{return of capital} + \text{opex} + \text{tax}$$

The MAR is determined annually by adding to (or deducting from) the allowed revenue, the service standards incentive (or penalty) and any allowed pass through amounts.

In the draft decision, the AER determined a nominal smoothed revenue allowance for Powerlink that increases from $536 million in 2007–08 to $736 million in 2011–12.[10] Powerlink's MAR for 2006–07 is $511 million.

Final decision

The AER has determined a nominal unsmoothed revenue allowance for Powerlink that increases from $537 million in 2007–08 to $778 million in 2011–12 as shown in table 8.

Table 8 AER's decision on allowed revenue ($m, nominal)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Return on capital	328.90	390.45	447.66	485.70	529.84	2182.54
Return of capital	39.78	46.19	41.17	45.60	44.95	217.69
Operational expenditure	147.63	156.76	169.18	166.99	177.30	817.86
Net taxes payable	20.50	22.64	22.53	24.01	26.25	115.93
Unsmoothed revenue	536.81	616.04	680.54	722.29	778.34	3334.01
Smoothed allowed revenue	536.81	595.79	661.26	733.91	814.55	3342.32

The net present value (NPV) of unsmoothed revenue for the next regulatory period has been calculated to be $2571 million. Based on this NPV amount, the AER has determined a nominal smoothed revenue allowance for Powerlink that increases from $537 million in 2007–08 to $815 million in 2011–12.

[10] The nominal unsmoothed revenue allowance increases from $536 million in 2007–08 to $720 million in 2011–12.

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1 Introduction

1.1 Background

The Australian Energy Regulator (AER), in accordance with its responsibilities under the National Electricity Rules (rules), determines the maximum allowed revenue for the prescribed transmission services provided by transmission network service providers (TNSP) in the National Electricity Market (NEM).

On 3 April 2006, Powerlink Queensland (Powerlink) submitted an application for the AER to determine its revenue cap for the period 1 July 2007 to 30 June 2012 (the next regulatory period). Powerlink is a Queensland government owned corporation. It owns, develops, operates and maintains Queensland's only high voltage electricity transmission network.

The Australian Competition and Consumer Commission (ACCC) determined Powerlink's revenue cap for a five and a half year period from 1 January 2002 to 30 June 2007 (the current regulatory period).[11]

The Australian Energy Market Commission (AEMC) commenced a review of the rules for regulating electricity transmission networks in the NEM in mid 2005. During Powerlink's preparation of its application, it was recognised that there was a need to provide certainty to Powerlink as to the basis on which the application would be assessed.

The new chapter 6A rules (new rules), which were gazetted on 16 November 2006, include transitional provisions for assessing Powerlink's revenue cap application (clause 11.6.12).[12] In general, the Powerlink transitional provisions require the AER to set Powerlink's revenue cap for the next regulatory period substantially (but not entirely) in accordance with the chapter 6 rules that existed at 3 April 2006 (the old rules) and the AER's *Statement of principles for the regulation of electricity transmission revenues* (SRP).[13] This decision has been prepared in accordance with clause 11.6.12 of the new rules.[14]

1.2 The draft decision

On 8 December 2006, the AER made its draft decision on the revenue cap to apply to Powerlink for the next regulatory period.[15] The draft decision approved nominal smoothed revenues for Powerlink that increased from $536 million in 2007–08 to

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11 ACCC, *Queensland transmission network revenue cap 2002—2006/07: Decision*, 1 November 2001.

12 AEMC, *National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006 No.18*, 16 November 2006.

13 AER, *Compendium of electricity transmission regulatory guidelines*, 22 August 2005.

14 Appendix A provides a summary of the review process undertaken for the consideration of Powerlink's revenue cap application.

15 AER, *Powerlink Queensland transmission network revenue cap 2007–08 to 2011–12—Draft decision*, 8 December 2006.

$736 million in 2011–12. Overall, the AER considered that the allowed revenues provided to Powerlink were sufficient to develop and maintain its network, and meet its obligations over the regulatory period.

The AER concluded that Powerlink's past capital expenditure (capex) of $1165 million for projects commissioned during the current regulatory period was prudent and included the amount in its regulated asset base (RAB). The AER also included an amount of $489 million for assets under construction in Powerlink's RAB at the end of the current regulatory period. The inclusion of the value of assets under construction was required to align with proposed changes to the regulatory accounting methodology for recognising capex.[16] In accordance with its roll forward methodology, the AER determined Powerlink's opening RAB to be $3781 million for the next regulatory period (as at 1 July 2007).

The draft decision approved a forecast capex allowance of $2032 million ($2006–07), with the indicative cost of approved contingent projects totalling $890 million. The AER considered that Powerlink had the potential to be able to deliver the amended forecast capex program for the following reasons:

- it was delivering significantly higher levels of capex in the latter years of the current regulatory period
- the initiatives undertaken by Powerlink to ensure it can deliver the increased capex appeared to be working
- a significant proportion of the higher capex is due to higher costs as opposed to increased physical work.

The AER determined a nominal vanilla weighted average cost of capital (WACC) of 8.76 per cent for Powerlink, comprising a post tax nominal return on equity of 11.68 per cent and a pre tax cost of debt of 6.82 per cent. The AER advised that it would not update the WACC for the final decision because the averaging period for the bond rates was fixed and the other parameters were prescribed by the new rules.

The AER also determined a total operating and maintenance (opex) allowance of $713 million ($2006–07) for Powerlink over the next regulatory period. The AER considered that this amount represented an appropriate allowance for Powerlink to undertake its operating and maintenance practices in an efficient manner.

The draft decision applied a service standards incentive scheme to Powerlink for the first time. The scheme included six performance measures and limited the revenue at risk to one per cent of Powerlink's allowed revenue.

1.3 Powerlink supplementary revenue cap proposal

On 15 December 2006, the AER received a supplementary revenue cap proposal (supplementary proposal) from Powerlink seeking an additional capex allowance of

[16] The AER's modelling of forecast capex provides the return on capital under the as-incurred approach and the return of capital under the as-commissioned approach. The AER refers to this as the 'hybrid approach'.

$469 million ($2006–07) based on updated information. The AER made its draft decision (8 December 2006) prior to receiving the supplementary proposal and therefore was not able to take account of this information in making its draft decision. Powerlink is now seeking a revised total forecast capex allowance of $2918 million.[17] Powerlink's supplementary proposal identified the need for additional capex based on:

- higher input costs for assets under construction and future capital projects
- changes in the probability of network upgrades due to generation associated with the Papua New Guinea (PNG) pipeline not proceeding in the next regulatory period
- advancement in the timing of forecast capex projects due to higher demand forecasts
- an additional high speed monitoring project to satisfy a National Electricity Market Management Company (NEMMCO) requirement.

The AER engaged Parsons Brinckerhoff Associates (PB) as a technical expert to advise it in relation to a number of key aspects of Powerlink's supplementary proposal.[18] Specifically, PB was required to provide its opinion on whether the additional forecast capex sought by Powerlink was reasonable and efficient based on:

- the revised capital cost estimates for assets under construction and projects that commence in the next regulatory period
- the revised probability of network augmentations as a result of generation associated with the PNG gas pipeline not proceeding during the next regulatory period
- changes in demand forecasts between 2005 and 2006.

PB has provided its advice on these matters and the AER has taken this into consideration in making its decision.

1.4 Submissions received by the AER

The AER received 14 submissions from interested parties commenting on its draft decision. The AER has taken into consideration the issues raised in submissions in making its decision. A list of the interested parties who made submissions can be found at appendix B. The key issues raised in submissions include:

- Replacement capex—the majority of submissions highlighted concern with PB's top down approach and stated that it was not an appropriate substitute for Powerlink's bottom up replacement plan. Therefore, it was not appropriate to adjust Powerlink's proposed replacement capex based on a top down methodology.

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17 Powerlink also advised the AER that it accepted a number of adjustments made by the AER in the draft decision which resulted in a reduction of $165 million.

18 PB Associates is the specialist strategic group of the US based Parsons Brinckerhoff Group of companies. It provides strategic management, regulatory, commercial and economic advice to the energy, water, major infrastructure and telecommunication sectors.

- Detailed project reviews—a number of submissions raised concerns with reductions made in the draft decision to several forecast capex projects. These concerns included:
  - demand side management was not always a practical option and may not affect the timing of projects
  - the short term evaluation of project options rather than over a longer-term
  - the deferral of a strategic easement acquisition may result in customers paying more at a later stage
  - increased business information technology capex is warranted to support a growing asset base.
- Input costs—the majority of submissions commented on labour and material costs. The main points raised were in relation to the labour escalation factors provided in the draft decision, which were considered too low and below the recent historical rates for the utilities and construction sectors. A number of service providers noted that they had experienced plant and equipment cost increases in the last two years and increases in input costs have been well above inflation.

1.5 AER's assessment approach

The regulatory framework for assessing Powerlink's revenue reset application is set out in section 1.3 of the draft decision and is not repeated in this decision. The AER's task is to establish a revenue cap for Powerlink based on its assessment of the efficient costs of providing electricity transmission services in Queensland consistent with the forecast demand for electricity and the condition of the transmission network in the state.

Given the importance of reliable and efficiently priced energy to the Australian economy, other stakeholders have a direct interest in the outcome of this decision. Following the release of the AER's draft decision, stakeholders were invited to provide their comments on it. These comments have been considered by the AER in finalising its decision.

The AER's assessment of Powerlink's revenue cap application involves a number of complex and technical issues. Accordingly, there is a need for the AER to exercise its discretion, after carefully weighing the evidence provided and having regard to the advice of its technical experts. In making its draft decision, the AER sought more than one expert opinion on particular aspects of Powerlink's application, where it was considered that additional technical or specialist advice was required. This process has essentially been followed by the AER in making its final decision. For example, given the majority of submissions highlighted concern with PB's top down approach to establishing Powerlink's replacement capex allowance, the AER has sought a second opinion from CHC Associates (CHC) on PB's findings.[19]

[19] CHC Associates Pty Ltd is a professional engineering consultancy firm that brings together senior engineering managers who have played key roles in the development of the NSW and South East Australian

In the draft decision, the AER sought advice from CHC on PB's findings in relation to the scope and timing of a number of Powerlink's load driven capex projects. CHC supported PB's recommendation to reduce the scope of some of these projects. In some instances, however, CHC noted that the prudence of PB's proposed changes to the scope of the project was unclear. The draft decision accepted PB's recommendations but the AER also acknowledged CHC's view on the scope changes and sought further information from Powerlink that its option is more efficient than that proposed by PB. Both PB and CHC were retained by the AER to review the additional information provided by Powerlink on the scope of these projects.

The AER also engaged Access Economics to revise its labour cost forecasts and NERA Economic Consulting to provide advice on hedging costs associated with interest rate risk. The AER is releasing its consultants' reports at the same time as the final decision and they should be read together.

Notwithstanding that specific capital projects have been proposed by Powerlink and a sample of these assessed by the AER, this decision does not require Powerlink to undertake or not undertake any particular investment. Under the ex ante framework, Powerlink has full operational discretion to allocate its expenditure allowances as it sees fit. It has an incentive to seek more efficient ways of delivering its services in order to maximise its profits while maintaining the service standards that have been set in the decision. These arrangements should provide benefits to users over the longer-term.

While the AER has determined a revenue cap for Powerlink, it is not prevented from undertaking capex which exceeds its ex ante allowance. Under the capex incentive framework applied in this decison, should Powerlink's capex exceed its ex ante allowance, it would lose the returns on and of that investment for the remainder of the next regulatory period. However, at the subsequent revenue reset, the actual written down value of the investment would be rolled into Powerlink's asset base and it would begin to earn returns.

1.6 Structure of final decision

This final decision sets out the AER's consideration of Powerlink's supplementary proposal and substantive new material raised by submissions in relation to specific issues. Except as specified in this final decision, the AER maintains its conclusions set out in the draft decision.

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electricity systems and markets. CHC Associates has provided services to Australian and overseas clients in a diverse range of areas including: transmission asset valuation; major project management, power system performance testing; and engineering, design and project advice.

The structure of the final decision is set out as follows:

- Chapter 2 sets out the AER's conclusion on matters requiring final resolution in relation to past capex and the asset base roll forward.
- Chapters 3 sets out the AER's conclusion on issues raised in submissions relating to Powerlink's original forecast capex proposal and the projects that the AER will allow as contingent projects.
- Chapter 4 sets out the AER's considerations from its review of Powerlink's supplementary revenue cap proposal and the AER's conclusion on the overall forecast capex allowance for Powerlink.
- Chapter 5 outlines the AER's conclusion on issues raised in submissions regarding the appropriate WACC and related financing costs.
- Chapter 6 sets out the AER's conclusion on issues raised in submissions regarding Powerlink's opex.
- Chapter 7 outlines the AER's conclusion on issues raised in submissions relating to Powerlink's service standards scheme.
- Chapter 8 sets out the AER's decision on Powerlink's maximum allowed revenues for the period 1 July 2007 to 30 June 2012.

Appendix A provides details of the review process.

Appendix B contains a list of the interested parties who made submissions on the AER's draft decision.

Appendix C sets out the projects that the AER will allow as contingent projects and their associated triggers.

Appendix D sets out the final formulae, graphs and information requirements associated with Powerlink's service standards scheme.

2 Past capital expenditure and opening asset base

2.1 Introduction

In the draft decision, the AER determined that Powerlink's expenditure of $1165 million on commissioned projects during the current regulatory period and $488.5 million of its assets under construction at the end of the current regulatory period were prudent. Based on the regulatory rate of return specified in the ACCC's 2001 revenue cap decision, the AER provided Powerlink with allowances for finance during construction (FDC) of $119 million for its commissioned projects and $24 million for its asset under construction. In accordance with its roll forward methodology, the AER determined Powerlink's opening RAB to be $3781 million for the next regulatory period (as at 1 July 2007). The AER noted in its draft decision that Powerlink was required to:

- advise it on the status of certain reviewed projects
- provide an updated forecast value of assets to be commissioned in 2006–07
- provide an updated forecast expenditure to be incurred for assets under construction in 2006–07.

This chapter sets out the updated forecast values for 2006–07 provided by Powerlink and its revised opening RAB for the next regulatory period.

2.2 Prudence of past capital expenditure

2.2.1 AER's draft decision

The draft decision reported PB's findings from its review of Powerlink's past capex program and included the following two points:

- Powerlink's project evaluation and implementation procedures for commissioned assets and assets under construction were consistent with good industry practice and generally well followed.
- Limited documentation at Powerlink's initial project evaluation stage could lead to inconsistency in the decision making process which may imply that the most economically efficient project alternative could be prematurely rejected.[20]

2.2.2 Issues raised in submissions

The EUAA stated these two statements appeared contradictory and inconsistent. It questioned whether limited documentation of the first stage of the project evaluation process could be considered good industry practice. The EUAA urged the AER to

[20] AER, *Powerlink Queensland transmission network revenue cap 2007–08 to 2011–12—Draft decision*, 8 December 2006, p. 14.

examine the implications of PB's findings and determine if the most efficient project alternatives had been implemented.

2.2.3 AER's considerations

PB's review of Powerlink's past capex projects identified some issues with Powerlink's oversight of certain projects. In the draft decision, however, the AER noted that the identified issues were not a consequence of systematic failings. One of the identified issues related to documentation of the reasons for rejection at the initial project evaluation stage of options that were not economically efficient or not technically feasible.

In its response to the EUAA's submission, Powerlink stated that the most efficient option would not be prematurely rejected because feasible options that are close in net present value terms are carried through to the full analysis process. Powerlink advised that only projects which are not close to lowest cost or have technical problems are discarded early in the analysis. The AER accepts Powerlink's explanation of its evaluation processes but considers that the EUAA's concerns would be better addressed through improved documentation at the initial project evaluation stage.

The AER also notes that PB's review found no systematic failing with respect to Powerlink's project evaluation and implementation of the most efficient alternative. Overall, the AER remains of the view that the ex post assessment of the past capex projects confirms that Powerlink had sound management practices which were generally applied.

2.3 Past capital expenditure—update of values

2.3.1 AER's draft decision

Assets under construction—approval of reviewed projects

In the draft decision, the AER included in the assets under construction component of Powerlink's RAB an amount of $488.5 million (exclusive of FDC) of which $92 million was associated with eight projects that still required formal approval by the Powerlink Board. This amount was included on the basis that these projects would receive Powerlink Board (or relevant delegated authority) approval before the end of the current regulatory period. The AER indicated that as part of finalising its decision, it would require Powerlink to provide information confirming that Powerlink Board approval had been obtained for these projects.

Update of values

In the draft decision, the AER included in Powerlink's RAB allowances for $1165 million (exclusive of FDC) of projects commissioned during the current regulatory period and $488.5 million of assets under construction to be incurred in 2006–07. As part of finalising its decision on the amount of assets under construction (and commissioned assets) to be included in the RAB, the AER stated that it would adopt Powerlink's most recent estimates for the final year (2006–07) of the current regulatory period.

2.3.2 Issues raised in submissions

Powerlink stated that of the eight reviewed projects included in the assets under construction component of its RAB, seven projects have now been approved by the Powerlink Board (or relevant delegated authority). It believed that interested parties should not have any concerns with the AER's decision to include updated expenditure levels for these projects in the assets under construction component of its RAB.

Powerlink also advised that the need for one project (Bowen transmission reinforcement CP.01265) had been deferred by one year into the next regulatory period and that the cost of this project should now be included in the forecast capex allowance.

2.3.3 AER's considerations

Assets under construction—approval of reviewed projects

In the draft decision, the AER recognised that between the period of releasing its draft decision and 30 June 2007, project approvals may be obtained from the Powerlink Board (or relevant delegated authority) and related expenditures would be incurred. Powerlink has since provided information confirming that the seven projects have been approved by the Powerlink Board (or relevant delegated authority) and provided an updated amount of $46 million (exclusive of FDC) to be incurred in the current regulatory period for these seven projects. The AER accepts Powerlink's advice that one project will no longer incur any expenditure in the current regulatory period and therefore that project cost will be transferred to the forecast capex allowance.

Update of values

The AER stated in its draft decision that, as part of finalising the decision, Powerlink was required to provide an updated forecast value of assets to be commissioned in 2006–07 and an updated forecast of expenditure to be incurred for assets under construction in 2006–07.

Powerlink has provided an updated amount of $263 million (exclusive of FDC) for the commissioning of assets in 2006–07.[21] This amount is considered to provide a better estimate of the value of assets to be commissioned in 2006–07 and consequently the total amount of Powerlink's commissioned assets during the current regulatory period is revised to $1146 million. Powerlink has also provided an updated total amount of $489.4 million (exclusive of FDC) for assets under construction in 2006–07. This amount is considered to provide a better estimate of expenditure for assets under construction which would be incurred before the end of the current regulatory period.

To the extent that the actual values for commissioned assets and assets under construction differ from forecast values for the final year of the current regulatory period, a reconciliation will be undertaken using the actual values as part of the asset base roll forward process at the next revenue reset.[22]

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21 The draft decision adopted a forecast amount of $282 million for the commissioning of assets in 2006–07.

22 As required by the new chapter 6A rules (clause S6A.2.1(f)(3)), the reconciliation would include adjustments that remove any benefit or penalty on the returns associated with any difference between the forecast and actual values.

Conclusion

Based on the updated information provided by Powerlink, the AER's conclusion is that an amount of:

- $1146 million in relation to commissioned assets during the current regulatory period is prudent and should be included in its RAB
- $489.4 million in relation to assets under construction at the end of the current regulatory period is prudent and should be included in Powerlink's RAB.

Table 2.1 provides a comparison between the draft decision and the conclusion in this final decision.

Table 2.1 AER's conclusion on Powerlink's past capex ($m, nominal)

	Commissioned assets	Assets under construction	Total
AER's draft conclusion	1164.69	488.52	1653.21
AER's final conclusion	1145.91	489.40	1635.31

Note: All figures are exclusive of FDC.

The updated information provided by Powerlink also requires the AER to revise its FDC allowances for Powerlink.[23] The AER's conclusion on FDC is to provide an allowance of:

- $117 million for Powerlink's commissioned assets
- $23 million for Powerlink's assets under construction.

Table 2.2 shows the break down of this allowance and provides a comparison between the draft decision and conclusion in this final decision.

Table 2.2 AER's conclusion on finance during construction costs ($m, nominal)

	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	Total
AER's draft conclusion:							
FDC–commissioned assets	13.25	17.93	15.06	19.61	24.14	28.63	118.61
FDC–assets under construction	–	–	–	–	–	24.21	24.21
AER's final conclusion:							
FDC–commissioned assets	13.25	17.93	15.06	19.61	24.14	26.66	116.64
FDC–assets under construction	–	–	–	–	–	23.49	23.49

Note: Total may not add up due to rounding.

[23] The ACCC's 2001 revenue cap decision recognised Powerlink's capex on an as-commissioned basis. Consequently, the ACCC accepted that it would be appropriate for capex to include an FDC allowance to provide for the efficient cost of financing projects when they are under construction but not earning revenues.

2.4 Asset base roll forward

2.4.1 AER's draft decision

In the draft decision, the AER rolled forward Powerlink's 2001 RAB and determined its opening RAB to be $3781 million for the next regulatory period (as at 1 July 2007).

2.4.2 AER's considerations

Based on the updated values for commissioned assets and assets under construction, the AER's application of the roll forward methodology has determined that Powerlink's opening RAB is $3753 million as at 1 July 2007. This value is used as an input for the AER's post-tax revenue model for the purposes of determining Powerlink's maximum allowed revenue during the next regulatory period.

2.5 AER's conclusion

Using the updated amounts for commissioned assets and assets under construction, the AER has determined Powerlink's opening RAB to be $3753 million for the next regulatory period (as at 1 July 2007). The RAB roll forward calculations are set out in table 2.3.

Table 2.3 Powerlink's opening RAB for the next regulatory period ($m, nominal)

	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07[1]
Opening RAB	2276.87	2394.51	2553.16	2680.32	2852.56	3007.53
2001 decision capex (adjusted for actual CPI)	155.24	180.12	190.79	233.26	202.37	93.35
CPI adjustment on opening RAB	66.92	82.39	50.59	63.24	85.09	73.26
Straight-line depreciation (adjusted for actual CPI)	–104.53	–103.85	–114.23	–124.26	–132.50	–140.36
Closing RAB	2394.51	2553.16	2680.32	2852.56	3007.53	3033.78
Add: prudent capex over the 2001 decision allowance[2]						206.17
Add: prudent assets under construction at 30 June 2007						512.89
Opening RAB at 1 July 2007						3752.83

[1] Updated with actual CPI for 2006–07. Based on updated forecasts of commissioned assets and assets under construction.
[2] The cash values for disposal of assets have been deducted from capex.

3 Forecast capital expenditure

3.1 Introduction

The AER has determined a forecast capex allowance for Powerlink based on an assessment of its original capex proposal and its supplementary proposal.[24] The AER has reviewed issues raised about Powerlink's original capex proposal separately from its consideration of Powerlink's supplementary proposal. This chapter sets out the AER's conclusion on issues raised in relation to the AER's assessment of Powerlink's original capex proposal, while chapter 4 contains the AER's conclusion from its review of Powerlink's supplementary proposal. Chapter 4 also sets out the AER's overall conclusion on Powerlink's total forecast capex allowance.

In the draft decision, the AER provided Powerlink with a forecast capex allowance of $2032 million ($2006–07) for the next regulatory period. Powerlink proposed a capex allowance of $2449 million. The AER's average annual capex allowance was $406 million compared to Powerlink's proposed average annual allowance of $490 million. The AER also approved contingent projects with a total indicative cost of $890 million.

The AER received submissions on the draft decision from Powerlink and other interested parties. Issues raised in submissions related to the level of load driven expenditure, replacement expenditure, security and business information technology (IT) expenditure, cost accumulation factors, and contingent projects. The AER has considered the submissions and where appropriate has sought further advice from its consultants before making its final decision.

3.2 Review of load driven projects

3.2.1 AER's draft decision

As part of its review of a sample of load driven projects, PB recommended scope and timing adjustments for 10 load driven projects resulting in a reduction of $147 million to Powerlink's proposed load driven capex allowance. The AER accepted seven of PB's recommended adjustments and concluded that Powerlink's load driven capex be reduced by $127 million. In general, the AER accepted PB's adjustments where CHC agreed with PB's recommendations or where CHC was uncertain whether PB's recommended project scope or timing was more efficient than Powerlink's proposal. However, in the latter case the AER sought further information from Powerlink to justify that its proposed project represented a more efficient option relative to PB's recommended option.

[24] Powerlink's supplementary proposal was received by the AER after the AER had made its draft decision.

3.2.2 Issues raised in submissions

Powerlink stated that the AER should not reduce its proposed capex allowance for five individual load driven projects.[25] It considered that:

- the AER had not given adequate consideration to Powerlink's reliability obligations, in particular where the AER had recommended that a project should be deferred through demand side management (DSM) or a temporary supply agreement with a connected party

- PB had considered only a short-term economic analysis in its recommendation to reduce the scope of a number of individual projects be reduced rather than considering the lowest cost solution based on a whole-of-life assessment.

Ergon did not consider that DSM and other similar initiatives provided a viable deferral of transmission infrastructure investment. It stated that Queensland already had a significant amount of DSM in place in the form of controlled hot water and that any potential gains from further load flattening would be at the margin and would not significantly affect the timing of Powerlink's projects.

Energex noted that, based on its experience, large customers expect N–1 reliability of supply and are unwilling to enter into DSM arrangements.

Townsville Enterprise provided specific comments on the Strathmore to Ross project. It engaged ROAM Consulting (ROAM) to examine the potential market benefits of Powerlink's proposal. It stated that ROAM's analysis demonstrated that the benefits of the project to North Queensland exceeded its cost and therefore deferment of the proposed project was not justified.

Sun Metals indicated that the Strathmore to Ross project would provide market benefits from reduced total delivered costs in North Queensland. It stated that the forecast demand was likely to underestimate the industrial load growth in North Queensland.

3.2.3 AER's considerations

The AER has examined the additional information provided by Powerlink and other submissions addressing five load driven projects where the AER made adjustments in the draft decision. These projects are the Strathmore to Ross line, the Larcom Creek substation, the line into Larapinta, the Woolooga to North Coast line and the South Coast easement.

The AER requested PB to respond to issues raised by Powerlink in its submission on the draft decision regarding these projects.[26] The AER also requested CHC to review

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25 Powerlink accepted the AER's conclusions on the Central Queensland–South Queensland review of projects and the Larapinta substation project.

26 PB Associates, *Powerlink revenue reset–response on selected issues in Powerlink's submission*, June 2007.

Powerlink's additional information and provide its opinion on the efficiency of Powerlink's proposed project scopes and timings.[27]

The AER's conclusions on each of these projects are set out below. The AER notes that the projects involve complex technical issues and that it has made judgements based on an assessment of the additional information provided by Powerlink, submissions and the advice of its consultants.

Strathmore to Ross 275 kV double circuit line (CP.01512/A)

The Strathmore to Ross project is the third stage of project to duplicate the existing 275 kV network between Broadsound and Ross. The first two stages involve the construction of double circuit lines from Broadsound to Strathmore via Nebo and the installation of a static var compensator (SVC) at Strathmore.

In the draft decision, the AER accepted PB's recommendation to reduce the allowance for this project by $16 million based on timing and scope considerations. PB considered that Powerlink could use DSM or a temporary lesser supply agreement with a connected party to defer the project under high growth scenarios. PB also considered that it was more efficient to use a single circuit low capacity line than Powerlink's proposed double circuit high capacity line. The AER agreed with PB, but given the comments of CHC, sought additional information from Powerlink demonstrating that its proposed project scope was more efficient than PB's recommendation.

Deferral for high growth scenarios

Powerlink considered that PB's recommendation to defer the project in high growth scenarios violated its mandated reliability obligations unless a lesser standard was allowed for under a connection agreement with the directly affected customer or DSM is agreed with appropriately connected customers. Powerlink stated that DSM was not available to defer the project and that it could not enter into a temporary lesser supply agreement with a connected party. It indicated that it had conducted several regulatory tests in North Queensland and had identified no suitable demand response. It also stated that DSM support would need to be pre-contingent, which would result in higher levels of DSM being required to defer the project.

Ergon supported Powerlink's claims, stating that small-scale DSM would not be successful in the near term and that it would not be willing to enter into a temporary lesser supply agreement with Powerlink. Ergon indicated that it had implemented a load management scheme in the area.

In response to Powerlink's submission on the draft decision, PB stated that a key reason for its recommendation to defer the project under high growth scenarios was that commissioning of new generation would take place in Townsville one year after the project was constructed.[28] It considered that the commissioning of new generation

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27 CHC Associates, *Powerlink revenue reset–CHC review of selected future capex reports and submissions*, 1 April 2007.

28 Under Powerlink's probabilistic model, generation is planted in Townsville under high growth scenarios in 2010.

would remove the reliability benefits of the line for five years. PB noted that under the 2006 demand forecasts used in the supplementary proposal, forecast load in the area had increased.[29] It acknowledged that this would increase the materiality of the risk of constraints but that this would be countered by the underlying generation development that would likely be advanced because of the increased demand. Therefore, PB maintained its recommendation to defer the project until 2014–15 for the high growth scenarios.

CHC considered that both Powerlink and Ergon had made cases for there being little potential for additional DSM in the area, given that Ergon has already implemented a load management scheme. However, CHC considered that if Powerlink was able to obtain grid support services, the annualised costs of the line would be less than the minimum estimated cost of the additional grid support services.[30] On this basis, CHC considered it would be more efficient to complete construction of the line rather than use grid support services for one year.

CHC also noted that Ergon as well as Powerlink has statutory obligations and that this means that the theoretical possibility of a negotiated reduction with the Ergon network was unlikely. Any reduction in the reliability standard would have to be negotiated with retail customers. CHC's assessment was that it would be difficult to negotiate an additional short-term arrangement to relieve a potential major overload and that this possibility should be dismissed.

The AER agrees with PB that the commissioning of new generation in the area would remove the reliability benefits of the Strathmore to Ross line until 2014–15. However, the AER notes that without a mitigation strategy to address a potential thermal constraint in 2008–09 and 2009–10, Powerlink would be at risk of violating its Transmission Authority. The AER therefore considers that the project should be deferred under the high growth scenarios if a feasible mitigation strategy can be identified.

PB identified two potential mitigation strategies available to Powerlink to defer the project, DSM or an agreement with a customer for a temporary reduction in supply. The AER notes that Powerlink already employ grid support services for North Queensland and have factored in their availability when assessing the need for the Strathmore to Ross line. The AER accepts CHC's advice that additional grid support services to that factored in by Powerlink would not economically defer the need for the Strathmore to Ross project due to their higher cost. Based on the information provided by Powerlink, the AER has not been able to identify any other DSM opportunities to defer the project.

In relation to a temporary lesser supply agreement, the AER has taken into account the views of CHC and Ergon Energy which indicate that it is unlikely Powerlink would be able to enter into such an agreement with a distributor or other connected party. No

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29 Under Powerlink's supplementary proposal, the project is advanced to 2008–09 for high growth scenarios. Section 4.4 covers the impact on capex due to the 2006 demand forecasts.

30 CHC stated that the capital cost of the Strathmore to Ross line is about $125 million, and assuming a nine per cent discount rate, the annual cost of the line is $11.3 million, which is less than the estimated cost of the additional grid support services that would otherwise be required.

other mitigation strategies were identified that would economically and reliably defer the need for the project.

Taking into account the advice of its consultants and the information provided by Powerlink and Ergon, the AER considers that Powerlink has provided sufficient evidence to indicate that the Strathmore to Ross project cannot be deferred through DSM or a temporary lesser supply agreement. As a result, the AER considers that Powerlink would be at risk of violating its statutory obligations if the project was to be deferred. Accordingly, the AER does not consider that the project should be deferred under high growth scenarios.

Scope of the project

PB considered that Powerlink's proposal to use twin sulphur conductors and string both circuits of the double circuit line was not efficient and that the use of twin phosphorous conductors with one circuit strung would initially be more economic.

In response to the draft decision, Powerlink provided a net present value (NPV) analysis to demonstrate that its proposal was more efficient than the option recommended by PB. Powerlink stated that under PB's option, a second circuit would need to be strung in 2016–17 to address voltage constraints. Powerlink also considered that PB's option would incur higher differential grid support costs and higher transmission losses. Powerlink's NPV analysis indicated that its proposed project scope had a lower cost than PB's option.

PB noted that the NPV of its option was only four per cent higher in costs compared to the NPV of Powerlink's option. Given the marginal difference in the final NPVs, their high sensitivity to the discount rates used, and the timing and the scope of the second stage of works, PB considered that a prudent TNSP should opt for the initially cheaper option and capture the potential for further deferrals in stage 2 works for the intervening six years. PB stated that it found it difficult to reconcile the need for further investment related to voltage constraints only six years after a considerable development. PB also stated that it had not tested the basis or validity of the timing or scope of any of the stage 2 works included in Powerlink's NPV analysis.

CHC considered Powerlink's proposal to be more efficient than PB's recommended option when taking the costs of grid support and the additional losses into account. It noted that Powerlink had used conservative assumptions for differential grid support and differential losses, and that this would increase the costs of PB's recommended option in the NPV analysis. According to CHC, the stringing of the second circuit under PB's option might need to be advanced because the amount of grid support required may not be available. CHC's view was that the AER should accept Powerlink's proposed scope for this project.

The AER notes that, consistent with its terms of reference, PB reviewed a sample of Powerlink's projects and recommended an alternative project scope and cost where it did not consider the project efficient. PB was not required to undertake an NPV analysis to demonstrate that its option was more efficient than Powerlink's proposal. For this reason, the AER sought further information from Powerlink on the relative efficiency of its proposal relative to PB's recommended option.

The AER requested Powerlink to provide more information on the need to construct a second circuit in 2016–17 under the option recommended by PB. Powerlink advised that voltage and transient constraints would limit the transfer capability into North Queensland. Powerlink stated that the transfer capability under PB's option is 35 to 50 MW less than Powerlink's proposal and that it would need to construct a second circuit by 2016–17 to address voltage and transient limitations associated with the maximum transfer capability into North Queensland. Powerlink also clarified that the maximum transfer capability takes into account the proposed development of network augmentations over the next regulatory period in North Queensland.[31]

The AER also asked Powerlink whether it had considered options that would defer the need for the second circuit. Powerlink advised that the installation of capacitor banks is not an effective way to address this transient limitation.[32] It also stated that no further potential exists to increase the voltage stability limit through the addition of static switched capacitor banks.[33] Taking into account this information, the AER considers that it is reasonable to assume that a second circuit would be required in 2016–17 under the option recommended by PB.

Following its review of Powerlink's NPV analysis, the AER considers that a number of adjustments are required to determine whether the Powerlink option is more efficient than the option recommended by PB:

- Powerlink's analysis included the differential transmission losses that result from the option recommended by PB. The reliability limb of the regulatory test does not recognise transmission losses as a cost in the present value analysis.[34] Therefore, the AER has removed transmission losses from the analysis.

- The AER also applied a discount rate more consistent with a commercial discount rate that has been applied by Powerlink in recent regulatory tests—i.e. nine per cent.

- Following CHC's advice, the AER considers that the differential grid support costs proposed by Powerlink are conservative and would need to be increased by a factor of up to 1.8.[35]

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31 Powerlink advised that the transfer limit under the option recommended by PB is between 1245 MW and 1260 MW. This compares with a transfer limit of 1290 MW under Powerlink's proposed scope of works. Powerlink noted that this transfer limit assumes the commissioning of the first and second stages of the North Queensland transmission reinforcement and the Strathmore SVC. It noted that the replacement of the far North Queensland lines would not affect the transfer limit between CQ and NQ because it is north of Strathmore.

32 Powerlink stated that the transient instability failure mode is not classic first swing, but rather large signal dynamic instability. It stated that under large disturbances the system damping is poor and beyond the transfer limit the oscillations grow and system separation occurs.

33 Powerlink stated that there are already so many capacitor banks on the North Queensland system that the SVCs at Nebo, Strathmore and Ross would be operating at the limit of their inductive range before the critical contingency.

34 ACCC, *Review of the regulatory test for network augmentations–Decision*, 11 August 2004, pp. 43-44.

35 CHC advised that the value assigned by Powerlink to the differential cost of grid support could be multiplied by a factor of up to 1.8.

When the above adjustments are taken into account, the AER calculated that the present value of Powerlink's option was lower than the PB option by $2.6 million. The AER therefore considers Powerlink's proposed scope for the project to be more efficient.

Overall, the AER accepts that Powerlink's proposed project scope and timing is efficient and that the associated cost of the project should be included in Powerlink's load driven capex allowance.

The AER notes that it also received submissions from Townsville Enterprise and Sun Metals indicating that the Strathmore to Ross project would result in net market benefits and should be included in Powerlink's ex ante allowance as proposed.[36] While the AER has reviewed this information, it considers that the above analysis demonstrates that Powerlink's proposal is efficient based on reliability (least cost) considerations.

Larcom Creek substation (CP.01958)

This project involves the construction of a new 275/132 kV substation with two 275/132 kV (375 MVA) transformers. It also includes the establishment of a remote 132 kV switchyard site connected via eight kilometres of double circuit line.

In the draft decision, the AER accepted PB's recommendation of a reduction in the scope of the Larcom Creek substation project. PB considered that:

- smaller transformers should be included
- the 275 kV switchyard should be based on three switchbays and seven circuit breakers (instead of eight switchbays and eight circuit breakers)
- it would be more efficient for Powerlink to construct a 132 kV line to the remote switchyard instead of a 275 kV line
- the project should be deferred until October 2009.

Except for the smaller transformers, the AER agreed with PB's recommendation but sought additional information from Powerlink about why it considered its project scope more efficient than the PB recommendation.[37]

In response to the draft decision, Powerlink stated that:

- Its proposed design of the substation takes into account the expected industrial developments in the Gladstone State Development Area (GSDA).[38] Given the potential load developments in the GSDA, Powerlink considered it would be prudent and efficient to construct the larger substation initially rather than stage the

[36] As part of its submission, Townsville Enterprise submitted a report from ROAM Consulting which showed that the project would result in market benefits.

[37] The AER agreed with PB's findings, with the exception that the transformers be reduced in size from 375 MVA to 200 MVA. The AER accepted CHC's assessment that the installation of larger transformers was prudent because changing transformers to a larger size at a later date would be a costly exercise.

[38] Powerlink considered that, given the size of the GSDA area, there was the potential for load in the Gladstone area to increase by as much as 2500 MW over the next 15 to 20 years.

construction.[39] Powerlink stated that its proposal would be more efficient than PB's recommended option if the substation needed to be upgraded within five years of the initial development.

- The only spare easement in this area is earmarked for 275 kV operation, and that as early as 2013–14 a 275 kV line may be needed to overcome a thermal limitation.

- The project was advanced to July 2009 due to a point load development in the M50++ sub-theme. As the sub-theme is now a contingent project, Powerlink accepted that the timing of the project should be October 2009.

In response to Powerlink's submission on the draft decision, PB stated that Powerlink had not provided any further information to warrant a review of its recommendations regarding the switchyard development over three bays or the 132 kV line to the remote switchyard. PB also noted that the additional works proposed by Powerlink should be captured under the contingent project mechanism for the M50++ sub-theme.

CHC noted that Powerlink had not provided evidence to indicate that a second stage development would be required within the five years. Further, it stated that if the second stage was required in 10 years, Powerlink's proposal is slightly ($0.3 million) more expensive than PB's option. CHC stated that if the AER considered this amount immaterial, Powerlink could be provided with an allowance to develop the substation in its preferred manner.

In regards to the layout of the substation, the AER considers that Powerlink's proposed project scope has a lower NPV cost than PB's recommendation if the substation needs to be upgraded within five years of its initial construction. However, Powerlink has not provided sufficient evidence that load growth in the Gladstone area will require the larger substation within five years of construction. Powerlink's 2006 demand forecasts show that forecast load growth for Gladstone has declined relative to the 2005 forecasts.[40]

While the AER acknowledges that the larger project scope may be needed should an uncommitted development occur, it does not believe a larger scope is sufficiently justified at present. The AER considers that a substation with three switchbays and seven circuit breakers rather than eight switchbays and eight circuit breakers should be constructed.[41] This is consistent with PB's recommendation.

In regards to the 275 kV line easement, CHC considered that a sufficient case for making an allowance for the construction of a 275 kV line has not been made on economic grounds, however, it noted that there was uncertainty about the ongoing application of the 132 kV line in the longer-term strategic plan of the network. According to CHC, it is good industry practice not to alienate land and build lines that do not have a longer-term use in the network. CHC also noted that if the AER was to

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39 Powerlink indicated there would be higher costs from civil earth works, removal of the original line entry diversion and substation panel modifications for the original line bay to suit the new configuration.

40 For example, under the 2006 demand forecasts, the forecast peak demand within the Gladstone zone that impacts on the Larcom Creek project is reduced 18 MW (2009–10) relative to the 2005 demand forecasts.

41 The AER accepts that the substation should be constructed with the larger 375 MVA transformers.

recommend construction at 132 kV, it would need to include an allowance for the cost of a new easement because it would not be possible to maintain secure supply while totally dismantling a 132 kV line to build a 275 kV line in the future.

While economic justification for the construction of the 275 kV line has not been demonstrated, the AER accepts CHC's advice that there are practical reasons for constructing the line at this voltage (but initially operated at 132 kV). The AER considers that this approach may be more efficient than 132 kV construction in the longer-term, primarily because Powerlink already has a 275 kV easement in this area.

The AER also notes Powerlink's advice that this project was advanced to July 2009 due to a point load development in the M50++ sub-theme. As the sub-theme is now a contingent project, Powerlink has accepted that the timing of the project should be October 2009. This is consistent with PB's recommendation.

The AER considers that a project with a smaller scope than that proposed by Powerlink should be used as the basis for establishing Powerlink's efficient forecast capex allowance. Specifically, the project should include two 275 kV (375 MVA) transformers, three switchbays and seven circuit breakers, and a 275 kV line initially operated at 132 kV to the remote switchyard should be constructed.[42] The AER also considers that the allowance should reflect a deferral of the project from July 2009 to October 2009. Following a request from the AER, Powerlink advised that the AER's conclusion would result in a reduction to the allowance for this project of around $2.2 million.

275 kV double circuit line into Larapinta (CP.01771/B)

In the draft decision, the AER accepted PB's recommendation to defer the timing of this project by one year through DSM or a temporary lesser supply agreement because of the relatively small overload forecast in 2011–12, the proximity of the project to the end of the regulatory period and the high cost of the project. However, based on CHC's comments, the AER sought further evidence from Powerlink that it was unable to negotiate with one of its customers for a temporary lesser supply standard and that DSM was not a viable option.

In its submission on the draft decision Powerlink considered that PB's basis for the deferment of this project to be speculative and PB's assessment of the resultant risk to be incorrect. It stated that, contrary to PB's suggestion, the risk of non-compliance with its mandated licence requirements was significant and that such non-compliance could lead to insurance cover being voided and leave directors and officers liable to negligence claims.

Powerlink stated that it would be highly unlikely that additional DSM will materialise at an economic cost to defer this project for the following reasons:

- residential DSM is already widely used

[42] As discussed in appendix C, the AER has excluded expenditure in the ex ante allowance for the Larcom Creek substation from the indicative cost of the Gladstone development contingent project.

- Queensland's relatively flat demand profile means that any new DSM would need to be available for extended periods over the summer months
- high load growth in South East Queensland (SEQ) means the amount of DSM required must increase significantly each year
- the DSM response must be available at call at the time of actual peak demand
- retailers prefer to keep interruption services for hedging against high pool prices.

Therefore, Powerlink considered that there was a substantial weight of evidence against the advancement of a suitable and cost effective DSM option to defer the Larapinta project by one year.

Powerlink also stated that the project has been the subject of joint planning with Energex (the connecting customer), and Energex has confirmed that it expects Powerlink to meet the N–1 standard for the forecast peak demand. Energex supported Powerlink's statement that it would not be able to enter into a temporary lesser supply agreement. Energex also stated that large customers expect full N–1 reliability of supply and have been unwilling to enter into DSM arrangements.

Based on its review of Powerlink's submission on the draft decision, PB considered that the incremental risk to Powerlink of deferring the line into Larapinta by one year would not significantly affect Powerlink or the connected parties. PB stated that the overload that triggered the augmentation was very low (2.6 per cent). PB also indicated that DSM opportunities, which may be historically limited, were only one of the options available to Powerlink. PB considered the primary focus of its recommendations was associated with discussing the risks to the affected parties of accepting a temporary (one year) lesser supply standard compared to the arguably conservative standard adopted in Powerlink's planning criteria. PB also stated that it had observed instances where Powerlink had shown good business judgement, and had planned and developed its network while potentially exceeding transmission limitations.

CHC considered that, based on the information provided by Powerlink, it would be difficult to realise a demand side response to defer the project. It noted that only if the AER or PB could point to a specific provider would it be appropriate to override the assessment of the TNSP. CHC also noted that Energex had provided support for Powerlink's assessment of the potential for DSM.

In terms of Powerlink negotiating a lower level of supply security with one of its customers, CHC also noted that like Powerlink, Energex has statutory obligations that prevent it entering into an agreement to provide a lesser supply. As a result, CHC considered that any reduction in supply standard would need to be negotiated with one or more retail customers. In CHC's opinion, such an arrangement was unlikely, particularly in relation to a short-term requirement and that it would incur significant set up costs. In addition, CHC was not able to identify any other mitigation strategies that would be available to defer the project. Overall, CHC considered that the proposed expenditure for this project should be accepted.

The AER notes PB's comment that Powerlink has shown good business judgement, and had planned and developed its transmission network while potentially exceeding transmission limitations. PB considered that its recommendations extend this approach to a number of different projects and scenarios to improve the timing and efficiency of Powerlink's selected options.

Powerlink responded that it has not knowingly exceeded transmission limitations and does not plan its network in such a manner. In addition, Powerlink does not accept PB's proposition that to do so constitutes good business judgement. It noted that PB's comments related to projects in North Queensland where Powerlink assesses the adequacy of the transmission capability over a range of generation sub-scenarios. Powerlink noted that its approach in this area acknowledges the conservatism of the sub-scenario analysis by assessing the cumulative risk across the six scenarios rather than a violation of one scenario.[43] Powerlink applied this approach to the Strathmore to Ross and Stanwell to Broadsound projects.

Powerlink noted that the Larapinta line project differs from projects in North Queensland and that there is no generation downstream of the transmission limitation that drives the reliability timing of the project. As such, there is no uncertainty in what capability the transmission system must be able to deliver for Powerlink to meet its mandated reliability of supply obligations. In these circumstances, Powerlink stated that it has applied definitive planning criteria to determine the project timing.

The AER accepts that Powerlink cannot exceed its transmission limitations under its statutory obligations. The AER notes that in the absence of a feasible mitigation strategy to address a potential thermal constraint in 2011–12, Powerlink would be at risk of violating its statutory obligations. As such, the AER considers deferral of the project would need to be based on the identification of a feasible mitigation strategy to address the potential thermal constraint.

PB considered that small-scale demand side responses would be available to defer the project or that Powerlink could enter into a temporary supply agreement with a connected party. After considering the information submitted by Powerlink on the difficulty of obtaining DSM in SEQ, the AER considers that DSM cannot be relied upon to address the potential constraint. The AER also considers that, based on Powerlink's advice and the supporting views of Energex, it is unlikely that Powerlink will be able to enter into a temporary lower supply agreement. In this regard, the AER notes CHC's assessment that it would be unlikely that Powerlink could enter into a lower supply agreement with retail customers to address the potential constraint.

In respect of other mitigation strategies, the AER has relied on the advice of CHC, which indicates that no other feasible mitigation strategies are available to defer the project. The AER therefore does not consider that the project should be deferred as it

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[43] Powerlink engaged Energy Market Services (EMS) to review the assumptions about generation capacity in North Queenland. EMS identified uncertainties with generation availability in North Queensland and considered that it required special consideration when planning the transmission network. EMS recommended assessing limitations against six generation sub-scenarios based on the cumulative risk of violating limitations across these scenarios.

has not been able to identify any feasible mitigation strategy that would address the potential constraint.

Based on CHC's advice, Powerlink's additional information and Energex's submission, the AER considers that Powerlink's proposed timing for this project is efficient and that the cost should be included in Powerlink's load driven capex allowance.

Woolooga to North Coast 275 kV double circuit line (CP.01264/A)

In the draft decision, the AER accepted PB's recommendation that a shorter line between Woolooga and Gympie would be a more efficient alternative for addressing the forecast reliability constraints. However, based on comments from CHC, the AER sought further information from Powerlink on the nature of the constraints in the northern Sunshine Coast area and the impact on customers resulting from PB's recommendation.

In its submission on the draft decision, Powerlink stated it had considered the establishment of a substation at Gympie early in the option analysis during joint planning with Energex but discarded that option because it did not have the overall lowest cost compared to other options—i.e. in the long-term. Powerlink also stated that development at Gympie would be strategically inferior for the ongoing network development of both Powerlink and Energex, and that establishing a 275/132 kV injection point at Gympie would not negate the need to establish the North Coast substation later. Powerlink provided an economic comparison of its proposed option and PB's recommended option, which showed that its proposed project scope had lower NPV costs. It considered that the AER should reinstate its proposed project scope in its final decision.

The Energex submission stated that Energex had undertaken joint planning with Powerlink to address thermal and voltage limitations on the recently upgraded Energex 132 kV network south of Woolooga. Energex indicated that although the immediate limitation relates to the section of the line to Gympie, the sections south to Cooroy, together with the voltage limitations at Noosaville and Sunrise Hills, are emerging issues that will require reinforcement by 2016—something it believed PB did not consider. Energex also stated that Powerlink's proposed solution addresses these limitations and caters for both Energex's and Powerlink's longer-term strategic plans. Overall, Energex did not believe that the establishment of a 275/132 kV injection at Gympie was prudent.

From its review of Powerlink's submission on the draft decision, PB noted that its recommended option has an NPV only marginally lower than the Powerlink option. PB noted that the deferral of 6 years for the second stage of augmentation has not been verified through detailed investigation and that the costs and scope of each stage of works have not been investigated. It also stated that the NPV analysis could be reversed by increasing the discount rate to nine per cent, and deferring the second stage works by an additional year.

CHC considered that the PB solution addressed a short-term limitation and it did not consider an equally serious limitation south of Gympie that will emerge within a few years. In CHC's opinion, a substation at Gympie would become redundant when the

second limitation is addressed by extending Powerlink's 275 kV network to the North Coast. CHC stated that it was apparent that the area of major load development would be adjacent to the North Coast and not near Gympie. CHC concluded that Powerlink's proposal was more efficient and strategic in nature than the option proposed by PB.

Powerlink and Energex have provided information on the nature of the constraints in the northern Sunshine Coast area. This information confirms that limitations are emerging in the North Coast area that will require reinforcement of the network by 2016. The AER notes that Powerlink and Energex planned the proposed project jointly and that Energex has identified strategic benefits to its network from Powerlink's proposal.

The AER has reviewed the NPV analysis supporting Powerlink's proposal and has adjusted it to apply a discount rate more consistent with a commercial discount rate that has been applied by Powerlink in recent regulatory tests—i.e. nine per cent. The outcome of this adjustment indicated that Powerlink's option was more efficient than the option recommended by PB.

Taking into account the advice of its consultants and additional information provided by Powerlink and Energex, the AER considers that Powerlink has demonstrated that its proposal is more efficient than the option put forward by PB as well as offering significant strategic benefits. The AER therefore accepts that Powerlink's proposed scope for the project is efficient and that its cost should be included in Powerlink's load driven capex allowance.

South Coast strategic easement project (CP.011865/A/B)

This project extends the width of an existing easement between the Moreton South and Gold Coast/Tweed zones to provide future support in the Gold Coast, Coomera and Beenleigh areas. In the draft decision, the AER accepted PB's recommendation to defer this project by one year based on its strategic nature, its proximity to the end of the regulatory period and its relatively high cost. CHC supported PB's recommendation, stating that based on the evidence presented, the easement acquisition was not critical and construction was not imminent.

Powerlink considered that the reasons given by PB for recommending the deferral of this project were arbitrary and contrary to the need to secure long-term reliability of supply to this rapidly growing area. It stated that PB had not given due recognition to the relevant considerations, including the:

- area's high load growth
- rapidly changing land use patterns in the area (including urban spread)
- need to give the community certainty with regard to future land use
- obligation under the SEQ Regional and Infrastructure Plan of the disclosure of future infrastructure requirements.

According to Powerlink, the easement is required to avoid future difficulties in obtaining land on which to establish new infrastructure in a future high residential area.

The AER accepts it is good industry practice to acquire some easements before they are required for augmentations if their acquisition is likely to result in lower costs for customers in the longer-term. In this regard, the AER notes that it has included a number of strategic easements in Powerlink's forecast capex allowance.

PB clarified that one of its key reasons for recommending the deferral of the project was its materiality (about 2.5 times the cost of the most expensive strategic easement acquisition) and that the timing of the expenditure was completely discretionary. It noted that Powerlink had not provided any supporting information about the timing or future use of the easement in the future. The AER does not agree with Powerlink that PB's reasons for deferring the project are arbitrary or contrary to the needs to secure long-term reliability of supply to this area.

The AER considers the critical issues for this project are whether the deferral of the project by one year will result in Powerlink not being able to obtain the easement or that the costs of the project will be significantly higher. Powerlink has not provided evidence to suggest that a one year deferral of the project will result in either the easement being unavailable or the costs of acquiring it being significantly higher. The AER considers it reasonable to defer this project until the subsequent regulatory period (2012–17) when there will be greater certainty over the cost, need and timing of the line project that the easement will be required to support.[44] The AER also notes that deferring the project will not prevent Powerlink from advising government and council agencies that this easement is potentially required in the longer-term and having it incorporated into land use plans.[45]

The AER maintains its position in the draft decision. Following a request from the AER, Powerlink advised that this conclusion would result in a reduction of $11 million to its proposed forecast capex. This conclusion is consistent with the advice of both PB and CHC.

Conclusion

After reviewing the advice of its consultants and the additional information from Powerlink and interested parties, the AER accepts Powerlink's scope and timing for the Strathmore to Ross line, some elements of the Larcom Creek substation, the line into Larapinta and the Woolooga to North Coast line projects. In particular, the AER found that:

- Powerlink's additional information demonstrated that DSM or a temporary supply agreement were unlikely to be viable options to defer the timing of two projects
- NPV analyses (incorporating the AER's adjustments) have demonstrated that three of Powerlink's proposed projects were more efficient than the options recommended by PB.

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44 The information provided by Powerlink does not indicate a specific time for the project, rather it indicates that significant reinforcement of the transmission network will be necessary in the long-term.

45 Under government planning arrangements, Powerlink is required to advise of its plans for the future development of its network, to have these included into land use planning and to ensure that corridors are available.

However, the AER considers that further information provided by Powerlink does not alter its conclusion regarding the South Coast easement project and some elements of the Larcom Creek substation project. Powerlink accepted the AER's conclusion relating to the Larapinta substation project (reduction of $9.1 million) and, after its own review of the CQ–SQ grid section, proposed a reduction of $41 million for projects associated with this grid section.

In summary, the AER has reduced Powerlink's load driven expenditure by $64 million relative to its original capex proposal as set out in table 3.1. This represents an increase of $63 million for load driven expenditure, relative to the AER's draft decision.

Table 3.1 AER's conclusion on load driven projects ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	408.26	387.40	196.23	207.45	196.47	1395.81
Larcom Creek substation	–3.82	–2.51	4.12	–	–	–2.22
Larapinta substation	–0.48	–1.13	–4.92	–2.29	–0.25	–9.07
South Coast easement	–	–	–1.79	–0.40	–9.25	–11.44
CQ–SQ review[1]	–21.35	–60.66	5.99	33.42	1.57	–41.03
AER's total adjustments	–25.65	–64.30	3.40	30.73	–7.93	–63.75
AER's conclusion	382.61	323.10	199.63	238.18	188.54	1332.05

[1] Powerlink advised that its review of the Central Queensland–South Queensland transfer limits resulted in revised project timing and costs for the projects associated with these limits. These adjustments have been accepted by the AER.

3.3 Replacement expenditure

3.3.1 AER's draft decision

In the draft decision, the AER accepted a recommendation from PB to establish an indicative replacement capex allowance of $702 million, $111 million less than the amount sought by Powerlink.

From its detailed review of a representative sample of replacement projects, PB found that the replacement forecast was based on a project scope greater than was justified by condition assessments. In PB's opinion, Powerlink's proposed replacement capex was an upper bound to the range of possible replacement expenditure. Although PB considered that Powerlink's proposed replacement expenditure may be overstated, from its detailed project reviews it was unable to determine the amount by which replacement expenditures should be reduced. PB considered it reasonable to use a top down approach based on the age profile of assets in Powerlink's RAB to determine an appropriate level of replacement expenditure. The AER agreed with this approach.

3.3.2 Issues raised in submissions

Powerlink

Powerlink submitted that it had put forward a comprehensive bottom up forecast of its replacement capex requirements over the next regulatory period, using robust engineering principles and condition based analysis to identify optimal replacement

timing and scope. It argued that the AER should not substitute a comprehensive bottom up replacement plan with a top down approach to set its replacement allowance.

Powerlink also argued that PB's findings on the scope of a number of the sample projects reviewed were incorrect. Powerlink claimed that PB had missed some critical information for each project in reaching its conclusions. Powerlink provided further information supporting its original proposed scope for these projects.

Evans and Peck

Powerlink engaged Evans and Peck to undertake an independent review of its bottom up replacement forecast and PB's findings. The Evans and Peck report was attached as appendix A to Powerlink's submission on the draft decision.[46]

Evans and Peck reviewed the processes applied by Powerlink and the options it had considered and found them to be of a high standard. It did not find any substation or line project that should be excluded from the replacement program or any obvious justifiable reductions to the scope of projects. It also stated that it could be argued that substations should have uniformity of technology, but it did not believe that significant whole-of-life cost reductions could be made by adopting a piecemeal approach within individual substations. It also stated that there were reasons for expenditure in the next regulatory period exceeding that indicated by the top down analysis, including the withdrawal of manufacturer support for some equipment and evidence of the need for some catch-up expenditure.

Evans and Peck concluded that given the small number of relatively large projects included in the forecast, and the lack of evidence supporting a view that the projects are unnecessary or over scoped, it was difficult to support PB's conclusions that a generic rule-of-thumb method should replace Powerlink's bottom up forecasting process. Evans and Peck considered that the AER should accept Powerlink's forecast replacement capex proposal.

Other submissions

EnergyAustralia, ElectraNet, Transend, TransGrid, Energex, Ergon and the Queensland Department of Mines and Energy (DOME) all expressed the view that the reduction in Powerlink's replacement capex based on a top down approach was not appropriate and should not be a substitute for a bottom up assessment. Other comments made by these interested parties included:

- PB's top down approach contained a number of questionable assumptions
- the top down approach could only provide an approximate cross-check of the reasonableness of the replacement program
- The use of a top down approach would set a precedent that would skew future capex submissions from network service providers

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46 Evans and Peck, *Powerlink revenue cap 2007–08 to 2011–12 AER draft decision—Review of replacement network capex*, January 2007.

- Powerlink was a recognised leader in the use of condition based monitoring and asset management.

3.3.3 Appropriateness of the top down approach

PB's response

The AER requested PB to review Powerlink's submission (including the Evans and Peck report) on the draft decision and respond to comments made about PB's review of replacement capex.

PB stated that its analysis of specific asset replacement projects proposed by Powerlink indicated overstatement of scope for some projects. However, it found it difficult to propose an alternative allowance because the risk and condition assessments were largely subjective. As such, PB reiterated that it was appropriate to use a top down analysis, which indicated that Powerlink's proposed allowance was high and the adjustment required was significant.

PB stated that rigorous bottom up analysis is an important tool to prioritise different asset replacement projects and to ensure efficient and effective use of the asset replacement budget. However, it considered that such an analysis is problematic if used to determine how much in total that a TNSP should be spending on asset replacement because, despite careful condition assessment and monitoring, the decision on when to replace a transmission asset was highly subjective.

Given the subjective nature of a bottom up assessment, PB considered that a top down analysis could be an appropriate tool to determine whether a TNSP's total replacement asset expenditure is appropriate. Further, it stated that if both a top down and bottom up assessments were to be undertaken, the top down analysis could be used to validate the bottom up assessment and regulatory analysis could focus on the reasons for any discrepancy.

Overall, PB accepted that its top down analysis was based on broad assumptions but it still considered that the outcome was reasonable. It noted that the main weakness of the top down analysis was the failure to consider any difference between current asset replacement costs and the replacement costs implied by escalating the 2001 asset valuation. While correction for this would tend to increase the indicated forecast replacement costs, PB considered that other assumptions made in the analysis were conservative and that a more detailed assessment of appropriate values for these assumptions would tend to reduce the indicated replacement costs.

CHC's review

Following concerns raised by interested parties, the AER sought a second opinion on the appropriateness of PB's top down approach in setting Powerlink's replacement capex allowance, including whether there was evidence of overscoping on replacement projects. The AER engaged CHC to provide its views on these matters.[47]

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47 CHC Associates, *Powerlink revenue reset–CHC review of replacement capex reports and submissions*, 27 March 2007.

CHC commented that it is often good practice when faced with a complex situation to try to obtain the size of an expected expenditure by making some basic assumptions. However, it considered that relying upon an estimate developed in this way required caution. CHC believed it would have been prudent for PB to use a top down estimate only as guide to how vigorously to review Powerlink's policies and procedures and the sample projects. CHC indicated that, faced with a conclusion from its top down analysis that overscoping may be present, PB's approach could have been to review:

- the assumptions of the top down approach to determine what accuracy might be expected from it
- the sample projects to determine whether over scoping of this size could be identified.

CHC found that most of the assumptions associated with PB's top down approach were arguable to some extent and, when combined, the potential error in the final result was too great to use for the purpose of establishing Powerlink's replacement allowance. CHC considered that the conclusion that it would justify reducing Powerlink's replacement proposal by $111 million lacked rigour. CHC stated this method failed to capture the following key factors:

- that replacement capex should be costed using unit costs applicable to future capex rather than the asset values implied by depreciation
- whether the 20 per cent premium applied by PB for brownfield conditions was adequate
- that some catch-up might be included in the proposed replacement allowance.

Based on these considerations, CHC stated that a smaller reduction than proposed by PB may be appropriate and that the margin for error is such that the proposal included in Powerlink's original application may be close to the replacement capex requirement. CHC also considered that concerns about setting a regulatory precedent by accepting a top down approach were valid and that such an approach may discourage network service providers from taking a rigorous approach to preparing their revenue proposals.

Overall, CHC considered that a top down approach should not be used to set allowances but rather to test the order of magnitude of an allowance that has been determined from a review of replacement principles and procedures and a detailed review of a sample of replacement projects.

AER's considerations

The AER has reviewed the additional information provided by Powerlink, PB's response, submissions on the AER's draft decision and the advice given by CHC. The submissions and CHC raised concerns with assumptions underlying the top down analysis and the appropriateness of setting Powerlink's replacement capex on this basis.

PB considered that the assumptions in its top down analysis were conservative and that the outcome of its analysis was reasonable. The AER reviewed the assumptions

underlying PB's top down analysis, and, while it agrees that some assumptions may be conservative (such as the appropriate capital weighted life for the assets), it considers that many of them have some degree of uncertainty—for example, that:

- depreciation was consistent with current replacement costs
- the premiums applied for works under brown field conditions and for augmentation elements are adequate
- an allowance for catch-up replacement work has been provided for in the estimate (e.g. the replacement of the Yabulu–Ingham–Cardwell–Tully lines).

Overall, the AER agrees with CHC that some assumptions underlying the top down analysis are arguable and that, given the potential for error when they are combined, it would not be appropriate to rely on that estimate to establish Powerlink's replacement allowance.

Consequently, the AER has reviewed projects identified by PB as having larger scopes than necessary in establishing Powerlink's replacement capex analysis. The review of these projects is set out in the following section.

The AER also agrees with CHC that an appropriate role for a top down analysis is verifying that an allowance established through a bottom up review is of the correct order of magnitude. However, the AER does not rule out future use of top down analysis to establish replacement allowances, particularly in those circumstances where there is greater certainty about the underlying assumptions and information is limited.

3.3.4 Evidence of overscoping

From its original review of Powerlink's replacement projects, PB found that a number of projects had scopes larger than the minimum necessary, although it was not able to quantify the amount of overscoping. Consistent with its conclusions on the appropriateness of the top down approach, the AER has reviewed the additional information provided by Powerlink, submissions and the views of its consultants to determine the extent of overscoping in Powerlink's replacement projects. In particular, the AER has reviewed three projects where PB indicated there was evidence of overscoping.

Powerlink's submission

Powerlink considered that PB's conclusion on the scope of the three projects was incorrect and did not recognise the integrated nature of high voltage substations or the operational circumstances of each project. It considered that PB had missed some critical information for three projects when reaching its conclusions. Powerlink provided the following information on each of the projects:

- Far North Queensland 132 kV line replacement project—Powerlink considered that it was more prudent to string both circuits of the line at the same time rather than PB's recommended staged construction of the line. Powerlink stated that under a staged construction of the line, one circuit would initially supply the towns and communities during construction of the second circuit. Powerlink noted that this

might mean these towns would be subject to frequent blackouts over several years and that a sustained outage of one of these circuits could lead to long outages. Powerlink considered that this was inconsistent with its reliability obligations.

- Replacement of Swanbank substation—Powerlink considered that PB's recommendation to reduce the scope of the project due to the planned decommissioning of Swanbank B power station was simplistic. Powerlink considered that a like-for-like replacement of the switchyard is required because it is not certain that the Swanbank B power station will be decommissioned before refurbishment is required. Powerlink stated that irrespective of whether and when Swanbank B is decommissioned, the substation will be required because it one of the Brisbane area's critical switching and transformation nodes and is not solely associated with the power station.

- Replacement of Tarong substation secondary systems—Powerlink agreed with PB that the condition of the equipment does not warrant the replacement of all the equipment. However, Powerlink considered that developing and maintaining interfaces between secondary systems and different technologies for the 87 per cent of the assets due for replacement and the remaining 13 per cent of assets would involve significant costs. Powerlink supported its claims by an economic comparison of its proposal and the PB recommendation. The analysis showed that it was economic to replace all equipment at the same time, primarily because of the high cost of interfacing secondary systems with different technologies.

Evans and Peck reviewed these three projects and PB's conclusions about them, and supported Powerlink's position that the scope of the projects was appropriate.

PB's response

The AER requested PB to comment on the additional information provided by Powerlink and Evans and Peck on the scoping of the three projects. PB made the following comments on the three projects.

- Far North Queensland line replacement project

  PB noted that stringing both circuits of the line would result in a major increase in the power transfer capacity between Townsville and Cairns. PB accepted that a single circuit replacement would leave one or more coastal towns dependent on a single circuit during construction and that this was not consistent with Powerlink's obligations under its Transmission Authority. However, PB highlighted that the single circuit would have been a relatively new cyclone-rated overhead line with a low probability of failure and a likely maximum repair time of a few hours.

  PB stated that Powerlink should have considered the single circuit option in more detail even though it would have required the community to accept a slightly elevated level of risk. PB noted that there was no evidence that Powerlink had discussed the acceptance of such a risk with Ergon or that it seriously considered the possibility of mitigating this risk in some way, such as by using stand-by generation. PB stated that based on the information provided it was unable to reach a conclusion

on whether the project selected for implementation was the most cost-effective option.

- Swanbank B substation rebuild

  The Swanbank B substation consists of six substation diameters providing 12 equipment termination bays. Powerlink proposed rebuilding the substation to increase the fault level and ensure compliance with its current standards.

  PB noted that it had supported the upgrade in its original review, but that the Swanbank B power station connections accounted for four of the 12 equipment termination bays in the substation. PB agreed with Powerlink that the substation was an important part of the network and that it would need to rebuild those parts of the switchyard that would still be required after the power station is decommissioned. However, PB considered that if decommissioning of the power station occurred, which seems likely, equipment in the unused bays should not be replaced and the switchyard should be rebuilt with a more compact layout.

  PB also stated that it was uncertain as to how Powerlink had developed its estimation of a $2.9 million reduction if the works associated with Swanbank B power station were not required. PB considered that its recommendation would result in a larger reduction.[48]

- Tarong secondary systems replacement

  Powerlink has proposed a complete replacement of secondary systems at the substation. PB considered that the condition assessment indicated a more targeted approach, with selective replacement of equipment. PB stated it did not understand why it is necessary to replace many of the panels completely as modern relays and other equipment are designed to fit directly into existing modular frames. While PB did not doubt Powerlink's economic analysis method, it noted that the outcomes of such analysis depend upon the input assumptions.

CHC's review

CHC stated that the information presented by Powerlink and Evans and Peck indicated reasons for the inclusion of more than minimum scope for the three projects identified by PB as being overscoped. CHC considered that the information presented by Powerlink to support this view was plausible but noted that Powerlink had provided some of it and that Evans and Peck had not verified it.

Swanbank B substation rebuild

According to CHC, if the Swanbank B power station is decommissioned, which is currently uncertain, some of the works may become redundant. CHC considered that—unless the replacement project addresses a high-risk situation—a prudent, capital

[48] PB noted that if Powerlink's estimate was based on four line termination bays not being replaced but the retention of six diameters, it would consider this excessive because it would involve the replacement of stranded assets. On the other hand PB stated that if the Powerlink estimate was to reflect a reduction to the size of the switchyard, PB would consider the costs savings should be greater.

constrained operator would wait until this matter can be clarified before committing to the work. It noted that because Powerlink's revenue cap is determined ex ante, Powerlink would be motivated to include this project and the AER must assess whether, in all circumstances, this is efficient.

Overall, CHC's view is that Powerlink had addressed issues raised by PB concerning the scope of projects and had made a good case for reverting to its original replacement capex proposal.

AER considerations

The AER is aware that reviewing replacement capex has inherent difficulties (as well as the general information asymmetry problem) compared with other types of capex. In contrast to reliability driven capex, there is usually no specific trigger for this type of expenditure. As such, the TNSP has discretion in the timing of its replacement capex that is not available for load driven capex.

The AER has considered Powerlink's additional information and the views of its consultants in determining whether there is any evidence of overscoping for three projects reviewed by PB.

Far North Queensland line replacement project

The AER considers that Powerlink has provided additional information to demonstrate that it is prudent to string both sides of the replacement line in far North Queensland. While the AER accepts PB's view that the second circuit will result in a major increase in power transfer capacity between Townsville and Cairns, above what is required in the short-term, it considers that Powerlink has demonstrated that reliability issues would result from a staged construction of the line, including the potential for a prolonged outage for a number of coastal communities between Townsville and Cairns.

PB acknowledged that these reliability issues exist but considered they could be addressed if Ergon was willing to accept a lower level of supply. The AER notes that Ergon's submission, while not directly commenting on this project, indicates that it would not be able to enter into a temporary lesser supply agreement. The AER also notes that PB was unable to reach a firm conclusion on whether the proposed project was the most cost-effective option. For these reasons, the AER considers that Powerlink's proposed project scope should be included in its replacement allowance.

Swanbank B substation rebuild

The AER accepts the views of PB and CHC that Powerlink's proposed project scope for the Swanbank B substation rebuild may include the replacement of stranded assets. Although it is planned to rebuild the substation before the closure of the Swanbank B power station, the AER considers that once the station is decommissioned replacing the power station's connection equipment would be redundant. The AER also notes that while there is some uncertainty over when the power station will be decommissioned, decommissioning is forecast to take place during the next regulatory period under all scenarios of the probabilistic model. For these reasons, the AER considers that it would not be appropriate to include an allowance for replacement of the power station connections as part of the rebuild project. This is consistent with PB's recommendation.

PB raised concerns with Powerlink's cost estimate of the reduced scope associated with its recommendation, and the AER sought clarification from Powerlink on the reduced scope associated with its cost estimate. Powerlink advised that the reduction was based on rebuilding the existing six substation diameters but not replacing four generator connection bays associated with Swanbank B.[49] The AER has reviewed the scope on which Powerlink developed its cost estimate and considers it to be appropriate.[50]

Tarong secondary systems replacement

Powerlink has provided additional NPV analysis that demonstrates that it is more efficient to replace the entire Tarong secondary systems. This information was not provided to PB at the time of its original review. The AER notes that Powerlink's analysis of PB's option includes the costs of interfacing different technologies and technical standards, network access and greater outage requirements.

PB stated that it is uncertain why it is necessary to replace many of the panels completely as modern relays and other equipment are designed to fit directly into existing modular frames.

Powerlink noted that PB's suggestion raises a number of technical issues, including the need to customise the systems design and integration issues that will occur over the lifetime of the asset. Powerlink also noted that the existing panels at Tarong contain a known safety issue associated with panel wiring. The condition of the panel wiring degrades to the point where it becomes unsafe to re-use, and occupational health and safety and wiring rules dictate that standards for safe maintenance practices must be maintained. Given the technical and safety issues involved, the AER considers that Powerlink would incur additional costs under a partial replacement option.

The AER considers that when the costs of the interfacing equipment are included in the NPV analysis, Powerlink's proposal is more efficient than the option recommended by PB.

Conclusion

Overall, the AER considers that Powerlink's proposed scope for the far North Queensland line replacement project and the Tarong secondary systems replacement project are reasonable. However, the AER considers that for rebuild of the Swanbank B substation, the works associated with replacing the Swanbank B power station connection equipment should not be included in Powerlink's proposed replacement allowance. Following a request from the AER, Powerlink advised that this conclusion reduces the proposed ex ante allowance by $2.9 million, relative to its original replacement capex proposal.

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49 This was in contrast to PB's recommendation to reduce the size of the substation.

50 The substation is located in a key part of Powerlink's network and is connected to six 275 kV lines. The equipment within the substation diameters, less the four generator connection bays, will still be required and will need replacement.

3.3.5 Conclusion

Based on its review of PB's comments, submissions and CHC's advice, the AER considers that Powerlink's replacement expenditure proposal should be accepted because:

- Uncertainties associated with the assumptions underlying PB's top down analysis mean it would not be appropriate to rely on the outcome of the top down approach to establish Powerlink's replacement capex allowance.
- The additional information provided by Powerlink suggests that it is reasonable for two projects identified by PB as being overscoped to have scopes greater than the minimum required.
- CHC's view that Powerlink had addressed the issues raised by PB regarding potential overscoping and that it had made a good case for reverting to the original replacement capex proposal.
- PB was generally satisfied that Powerlink had procedures for identifying and prioritising replacement requirements consistent with good industry practice. Further, PB did not find overscoping of any other project that it reviewed as part of its original assessment.

The AER, however, agrees with PB and CHC that the Swanbank B rebuild had a greater scope than necessary and therefore it has reduced Powerlink's replacement allowance by $2.9 million from its original capex proposal.

Table 3.2 sets out the AER's conclusion on the appropriate replacement capex allowance for Powerlink over the next regulatory period.

Table 3.2 AER's conclusion on Powerlink's replacement capex ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	113.72	93.58	208.07	196.39	201.05	812.80
AER's adjustment	–	–	–0.19	–0.73	–2.01	–2.93
AER's conclusion	113.72	93.58	207.88	195.66	199.04	809.87

3.4 Security and compliance expenditure

3.4.1 AER's draft decision

In the draft decision, the AER accepted PB's recommendation to defer some expenditure associated with the transmission line security upgrade project to the following regulatory period (2012–17), resulting in a reduction in expenditure in the next regulatory period (2007–12) of $13 million. This project has an estimated cost of $49 million over the next regulatory period and involves prioritising transmission towers and implementing specific security measures.

3.4.2 Issues raised in submissions

Powerlink considered that its proposed expenditure on security and compliance obligations is prudent and efficient. It stated that PB's recommendation did not take into account the careful process that it used to establish the scope of works required to address security concerns. Powerlink considered that if this reduction was made, it would face considerable risks, that the AER should reverse its decision. Powerlink also stated that it was unclear what changes PB was actually proposing and that PB's reduction was arbitrary.

3.4.3 AER's considerations

PB stated that its transmission line upgrade project assessment had provided it with an understanding of the history, need and risk-based approach Powerlink undertook to identify works to improve the security of its network. PB was satisfied of the need for the proposed works, which involve prioritising towers based on their location and criticality and implementing specific security measures. However, PB considered that not all the works would need to be implemented in a single regulatory period because the consequences of interference will vary across the network. It considered that if the most critical elements of the network are identified and targeted early in the project, the bulk of the risk from interference will be mitigated by the end of the next regulatory period.

The AER considers that PB's review took into account the process Powerlink had used when reviewing this project. It agrees with PB that the majority of security risks would be lessened once the critical elements had been identified and treated. The AER also considers that Powerlink has considerable discretion over the timing of the works and that it would be efficient for the works in the next regulatory period to focus on those lines where the consequences of security breaches are greatest. Therefore, the AER agrees with PB's finding that there is no need to provide an allowance for the implementation of the entire scope of works over a single regulatory period.

Powerlink stated it was uncertain what PB was actually proposing with its recommendation about the transmission line security upgrade. PB clarified that its recommendation is that around 25 per cent of the expenditure proposed for this project be deferred to the 2012–17 regulatory period and that this expenditure should relate to works on less critical elements. PB also advised that it had flattened the annual expenditure profile of the project to reflect a more practical approach to the works. PB noted that originally 87 per cent of the entire expenditure was programmed over two of the five years of the regulatory period.

The AER considers that PB adequately assessed the process that Powerlink had used to establish this project. Further, the AER notes that Powerlink has not provided additional information demonstrating that the deferment of a part of this project will considerably increase its risk profile. The AER therefore maintains its position that Powerlink's proposed allowance for this project should be reduced by $13 million, with the remaining expenditure being flattened in accordance with PB's recommendation. The AER considers that PB's recommendation is a reasonable basis on which to set an efficient forecast capex allowance. However, it should be noted that under the ex ante capex framework, Powerlink is not prevented from undertaking these projects in line with its proposed scope and timings.

3.5 Business IT expenditure

3.5.1 AER's draft decision

In the draft decision, the AER accepted PB's recommendation to reduce Powerlink's proposed business IT project expenditure by 15 per cent for 2009–10 to 2011–12 (a reduction of $4.1 million) so that its forecast aligned more with the longer-term average of these expenditures.

The business IT plan submitted by Powerlink covered a five-year period and was divided into two categories: IT replacements such as hardware and cyclical upgrades, and IT projects that include infrastructure and application based projects. The replacements component of the plan extended for the full five years of the next regulatory period, while the projects component extended only two years of the next regulatory period—i.e. it extended to 2008–09. Powerlink used a rolling average of the previous three years to forecast the projects expenditure over the remaining three years of the next regulatory period.

PB found that Powerlink's business IT projects forecast for 2006–07 to 2008–09 included a number of large one-off projects and that expenditure in these years was considerably higher than in the preceding four years. PB considered that the proposed allowance for the last three years of the next regulatory period should be reduced to a level more commensurate with the long-term average of these expenditures. The AER agreed with PB that the use of a rolling average would result in an inefficient forecast if it included these one-off type projects.

3.5.2 Issues raised in submissions

Powerlink stated that PB's recommendation to reduce business IT expenditure by 15 per cent is based on the unsound assumption that IT expenditure should be derived from historical averages of a set period and should exclude one-off projects. Powerlink considered that the reduction would leave it ill equipped to meet successfully the IT requirements that it considered will arise because of changes in the transmission sector.[51] It considered that the AER should reverse its draft decision.

3.5.3 AER's considerations

PB found that the period used to develop the rolling average included a number of large one-off projects and that the expenditure in this period was considerably higher than in the four preceding years. PB stated that it did not consider Powerlink's proposal necessary or efficient over the next regulatory period and recommended reducing Powerlink's allowance by 15 per cent in each of the last three years of the next regulatory period. It considered this would reduce the allowance to a level more commensurate with the long-run average of expenditures. PB considered its estimate to be conservative.

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[51] Powerlink identified the AER's market based performance measures, the AEMC's review of congestion management and the Energy Reform Implementation Group review as examples of the potential need to invest in new systems to support improved data gathering and analysis.

Powerlink stated that the suggestion to discard one-off projects in the IT plan when projecting forward is unsound and that there will still be one-off projects but they will be different to past one-off projects.

The AER notes that PB has not discarded any one-off projects. PB developed an allowance that is closer to the long-run average of this category of expenditure. PB found that the period over which Powerlink developed its rolling average included some large one-off expenditures and that this had the potential to distort the forecast. From its review, the AER also identified some large one-off type projects that Powerlink proposed to undertake in the first two years of the next regulatory period, e.g. recabling of offices and reinforcing server capability. The AER does not consider it appropriate to forecast future business IT requirements using these large one-off type expenditures.

The AER considers PB's recommendation is reasonable for the following reasons:

- It is conservative. The recommended allowance for the last three years of the next regulatory period is around $10 million per annum compared with $6 million per annum in the previous regulatory period.
- The recommended allowance is significantly higher than that undertaken by Powerlink in the current regulatory period, reflecting that the business has grown.
- It does not adjust the first two years of Powerlink's proposal, which are the result of a detailed plan.
- It does not change the replacement IT forecast proposed by Powerlink.

For these reasons, the AER maintains its position in the draft decision. It considers that PB's recommendation to reduce the project component of the business IT forecast by 15 per cent for the last three years of the next regulatory period is appropriate and provides a reasonable basis by which to establish an efficient business IT allowance for Powerlink.

3.6 Cost estimation risk factor

3.6.1 AER's draft decision

Powerlink applied a cost estimation risk factor to its projects to reflect that cost outturns are generally higher than cost estimates. In the draft decision, the AER removed the cost estimation risk factor Powerlink applied to its projects. The AER's reasons for not including the cost estimation factor included that:

- the original Evans and Peck report (March 2006) did not provide any evidence that Powerlink's actual history of cost overruns was material or of the magnitude assumed
- the risks were captured to some extent by the base planning object (BPO) update process

- it was unclear whether the estimates used by Evans and Peck were the mean or mode

- the application of a risk factor effectively transferred the risk to Powerlink's customers when Powerlink was best placed to manage them.

Overall, the AER agreed with PB's finding that Powerlink had not sufficiently justified the need to apply an additional cost estimation risk factor to its forecast capex estimates.

3.6.2 Issues raised in submissions

Powerlink stated that since the submission of its revenue proposal, it had collected data on the majority of its projects completed over the current regulatory period. Powerlink also advised that it had re-engaged Evans and Peck to undertake an independent analysis of actual project costs against estimated project costs over the current regulatory period.[52]

Evans and Peck's analysis found that Powerlink's actual project costs have been on average 9.4 per cent higher than estimated costs over the current regulatory period. Powerlink stated that a cost estimation risk factor is clearly warranted, and that it has been conservative in its revenue cap application by seeking a risk factor of 2.6 per cent. On this basis, it stated that the AER should reverse its draft decision to remove the cost estimation risk factor.

Queensland Alumina Limited considered that the AER should remove the cost estimation risk factor because Powerlink builds sufficient additional allowances into its capex project estimates.

3.6.3 AER's considerations

In its submission to the draft decision Powerlink responded to the AER's reasons for not accepting the application of a 2.6 per cent cost estimation risk factor. These responses and the AER's consideration of them are set out below. The AER also requested PB to comment on Powerlink's additional information, including the Evans and Peck report (attached as appendix B to Powerlink's submission on the draft decision).[53]

Risk factor not based on actual project outcomes

In the draft decision, the AER considered that the Evans and Peck report did not provide any evidence that Powerlink's history of actual cost overruns was material or of the magnitude assumed.

Powerlink stated that since it submitted its application it had provided Evans and Peck with the data on budget estimates and outturn costs for 119 projects from the current regulatory period. Evans and Peck's analysis found that Powerlink's actual project costs have been 9.4 per cent higher than estimated costs over the current regulatory period.

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52 Evans and Peck is a management consultant that specialises in improving performance and outcomes in the delivery of major infrastructure projects and programs.

53 Evans and Peck, *Powerlink revenue cap 2007–08 to 2011–12 AER draft decision—Risk adjustment of capital budget*, January 2007.

PB stated that the historic information used to quantify the 9.4 per cent risk factor is not open and transparent. It considered that it was not clear that the Pert distributions used in the analysis are weighted by the overall value of projects and therefore it questioned whether the 9.4 per cent estimate can be applied across the whole forecast capex program. It was also unclear what the drivers were for the systematic increase in the outturn costs in the historical projects compared with the original estimates. PB stated that such information should be readily available from the list of historic projects.

The AER reviewed the Evans and Peck report of January 2007 and asked Powerlink to clarify the data and approach used in the Evans and Peck analysis further. The AER notes that the projects used by Evans and Peck in its analysis have completion dates from February 2002 to February 2007.[54] The AER considers that this sample period is too short and that the unexpected demand growth and input cost increases experienced during the current regulatory period have distorted the data derived from it. The volatility can be seen from the particularly large range in the distributions estimated by Evans and Peck for high, medium and low-risk projects. These estimated distributions have significantly larger ranges than proposed by Evans and Peck in its original report, which was based on its experience and knowledge.

The AER also sought clarification of the Evans and Peck approach used to construct probability distribution functions for high, medium and low-risk projects. Based on information provided by Powerlink, it appears that Evans and Peck constructed the functions by using the percentage overrun or underrun of past projects without regard to the value of the project.[55] The limitation of this approach is that past projects of high and low value should not be equally important in estimating any future average budget overrun. The AER agrees with PB that it is possible that projects with low value but high-cost overruns have distorted the Evans and Peck analysis.

In summary, the historical analysis has provided evidence of a tendency for projects to exhibit higher outturn costs. The AER, however, considers that a factor of 9.4 per cent is likely to overstate the estimation risks faced by Powerlink over the next regulatory period, because it is based on a short sample period and does not take into account the monetary value of the projects. The AER considers that the 2.6 per cent risk factor identified by Evans and Peck in its original report provides a better approximation of the cost estimation risks faced by Powerlink because it was based on Evans and Peck's experience and knowledge of the delivery of major infrastructure projects and programs.

Risks already captured in Powerlink's BPOs

In the draft decision, the AER considered that the risk of costing a project of known scope in advance was already captured to some extent in Powerlink's BPOs, as these were updated on an ongoing basis to factor in actual project cost outcomes.[56] In its submission on the draft decision, Powerlink stated that BPOs do not explicitly take into account risks such as wet weather, latent soil conditions, access restrictions and other

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54 Powerlink stated that the 119 projects used in the sample included 95 per cent of the expenditure in the current regulatory period and that the projects were representative of the projects in Powerlink's forecast capex program.

55 The AER notes that Evans and Peck removed two projects with the largest overspend from the analysis.

56 See section 4.6.6 of the AER's draft decision for a discussion on BPOs.

factors. It stated that it fits these risks into the BPO model afterwards, based on information about the project such as more refined route knowledge, preliminary geotechnical surveys, likely commissioning timing and coincidence with wet seasons.

PB stated that BPOs reflect installed and commissioned costs and implicitly include some assumptions about unforseen influences since they take account of earlier project outcomes. Given the rigour of Powerlink's refined cost estimating process, PB considered that the systematic risk of understating cost estimates was low.

The AER asked Powerlink to provide more information on how it excluded risks such as wet weather, latent soil conditions and access restrictions from the BPO estimation process. Powerlink responded that during the typical execution of a project, it registered such risk items as variations against the contract, which it removed when estimating costs for new projects. For example, Powerlink advised that it recently completed a number of 275 kV line projects that experienced a range of project specific risks, including extra access requirements, special vegetation clearing, over canopy construction, traffic management and protection of seasonal fauna and flora. Powerlink stated that it removed these items from the outturn project costs prior to the BPO update.

From its review of the additional information provided by Powerlink, the AER is satisfied that the BPO update process does not capture the risks contained in the cost estimation risk factor. Further, the AER notes that Powerlink has not included a contingency factor in the project estimates it has developed for its capex proposal.

Input cost escalators already include some of the identified risks

In the draft decision, the AER considered that some listed risks (e.g. input cost escalators) were partly taken into account in Powerlink's forecast capex estimates. In its submission on the draft decision Powerlink stated that the Pert distributions and Monte Carlo method used to determine the risk factor recognise that outturn costs could be higher or lower than estimated costs. It stated that inherent in this approach is that input costs will be different to those assumed. Powerlink stated that there is no assumption that the escalators are systematically over or underestimated.

PB stated that Powerlink's BPO and escalation rates capture labour, material and plant costs. However, the AER considers that while the input escalators are applied to the BPOs, they are the most likely outcome and do not systematically over or under estimate. Therefore, there remains a risk that they will be higher or lower than forecast.

Cost estimation risk factor transfers the risks to customers

In the draft decision, the AER agreed with PB that the addition of the cost estimation risk factor to project cost estimates effectively transferred the risk to Powerlink's customers. The AER considered that Powerlink was best placed to manage these risks and should be given an incentive to implement initiatives to manage them. In response Powerlink stated that it is accepted throughout the construction industry that there is not an equal probability of a project coming in *x* per cent under its budget rather than *x* per cent over its budget, and that this is why projects are approved with a contingency factor. Powerlink stated that it has not included a contingency factor in its estimates and that a cost estimation risk factor needs to be included. Powerlink believed a factor of 2.6

per cent was extremely modest and that it would be rightly managing risks of project overruns in excess of this allowance.

PB considered a 2.6 per cent risk adjustment factor was not reasonable given the nature of the unforeseen risks identified by Powerlink. Further, it stated that the risks Powerlink is trying to lessen should diminish over time as experience is gained and feedback is passed on to the estimating process.

Evans and Peck's March 2006 report set out a number of risks experienced by Powerlink on projects. The AER asked Powerlink to identify initiatives or actions it had taken to address these risks. In its response, Powerlink identified a number of measures it had taken to better manage the risks, but stated that these risks have not been eliminated. Powerlink stated that it is:

- working to streamline its easement and route acquisition processes—for instance, by proactively seeking and obtaining ministerial designations for line routes and substations
- seeking involvement in various committees, standard groups and peak industry bodies to obtain advance warning of impending legislative changes that may impact on the costs of projects
- seeking the establishment of long-term contractual agreements, ensuring the availability of the required skilled workforce
- investigating site conditions thoroughly to identify hidden risks because the exact costs of recovery for decommissioning/disposal are uncertain.

The AER considers that these initiatives should assist Powerlink to reduce the risk factor to below the level experienced in the current regulatory period. However, the AER notes that some risks are outside Powerlink's control (e.g. wet weather), and that some new risks (e.g. new legislative requirements) cannot be captured accurately in the estimation process. The AER also considers that, to the extent that Powerlink's cost estimation risks are greater than 2.6 per cent, it will have an appropriate incentive to address them.

Whether the costs estimates used were the mode or the mean

In the draft decision, the AER stated it was unclear whether the cost estimates used by Evans and Peck in its analysis were the most likely (mode) or the expected (mean) cost outcome. The AER indicated that if the cost estimate for each project represents the mean cost for the project, the average forecast total expenditure must be equal to the sum of the cost estimate for each project. If this was the case, no risk adjustment would need to be made. Powerlink has advised that the cost estimates used by Evans and Peck were the most likely outcome (mode) for each project. The AER accepts that the cost estimates used in the analysis were the most likely outcome and not the expected cost.

Risks identified were minor cost elements

In the draft decision, the AER noted that PB considered many of the identified risks were associated with minor cost elements of projects and that applying the proposed

risk profile to these items was unrealistic given that the major cost components of substations are plant and equipment. Powerlink responded that while the Evans and Peck report identified some examples of risks that the risk factor was intended to capture, the list itself was not intended to be a definitive list of the risks that might be experienced. Further, it stated that the cost impact of the risks is unknown, which is why undertaking the Monte Carlo analysis would ensure that cost overruns and underruns across a portfolio of projects are diversified, and the total risk adjustment is not systematically too high or too low.

According to PB, there is a lack of information about the types of unforeseen risks being mitigated. PB considered that such information should have been readily available from the list of historical projects used by Powerlink and Evans and Peck, to arrive at the 9.4 per cent risk factor. It noted that Powerlink had elaborated on some of the risks (e.g. wet weather, unforeseen or latent soil conditions and access restrictions) but Evans and Peck had not commented on this matter.

The AER accepts it is not possible to explicitly identify all the risks captured by the analysis because many of them are unforeseen and hence their cost impact is unknown.

Conclusion

The AER considers that Powerlink has provided additional information that sufficiently establishes the tendency for outturn costs to be greater than budget costs, due to factors unforeseen at the time of preparing the project cost estimates. The AER also considers that Powerlink has reasonably addressed the issues raised in the draft decision. However, the AER does not accept that a cost estimation risk factor of 9.4 per cent is appropriate, primarily due to the limited and volatile period over which cost outcomes were assessed and because the distributions used in the analysis were not weighted by the value of the projects.

Overall, the AER considers it reasonable to apply a cost estimation risk factor of 2.6 per cent to Powerlink's forecast capex estimates, to reflect risks outside Powerlink's control when estimating project costs.

3.7 S-curves adjustments

3.7.1 AER's draft decision

As part of its cost accumulation process, Powerlink uses S-curves to estimate the expenditure profile associated with each of its projects. Powerlink has developed 10 generic S-curves, based on typical historical projects, to reflect the different expenditure profiles associated with different project types. Powerlink stated that when it was preparing its revenue cap application, it was not apparent what would actually occur to the incidence of expenditure on projects were being constructed under tightening equipment supply conditions. For this reason, Powerlink adjusted four of its generic S-curves to provide for a notional 25 per cent prepayment to address the risk of delays in the delivery of plant.

In the draft decision, the AER accepted PB's recommendation not to apply the prepayment adjustment Powerlink made to four of its S-curves. PB recommended removing the adjustment because:

- the risks envisaged by Powerlink were already captured in the historical S-curves to some extent, as they were based on current market conditions

- prepayments may not be an efficient or appropriate way to mitigate the risk of manufactured items not being delivered on time

- it was unclear whether prepayments would be necessary for all projects of the nominated type or whether they would be required for the duration of the next regulatory period

- Powerlink uses long-term high volume supply contracts to ensure timely delivery of long lead critical items.

3.7.2 Issues raised in submissions

Powerlink considered that the AER and PB did not understand that it had based its adjustment to the S-curves on a notional adjustment intended to capture the range of outcomes caused by the tight supply conditions and not just prepayments. Powerlink engaged Evans and Peck to provide more detail about the issue, and to comment on the extent to which current tight supply conditions would need to be captured in adjustments to some S-curves. Evans and Peck concluded that tight market conditions do exist and that some historical S-curves need to be adjusted to model cash flows associated with efficient project delivery in this market.[57] However, Evans and Peck did not agree with adjustments made by Powerlink to two of its historical project S-curves and considered the other two adjustments were at the high end of its expectations.

Evans and Peck also commented on PB's recommendation that the S-curves should not be adjusted:

- Tight market conditions were already included in historical S-curves. Based on data provided by Powerlink, Evans and Peck found that all projects used to develop the generic S-curves (except for one) began in or before 2003. Therefore, it did not support PB's assertion that the historical S-curves incorporated the tight market conditions encountered in 2006. Evans and Peck considered there had been a material change in market conditions since the historical S-curves were developed.

- Prepayments may not be an efficient mechanism to ensure delivery. Evans and Peck agreed with PB, but noted that manufacturers in some sectors of the power industry require prepayments because in reality they have limited recourse to transfer the product to another project if an order is cancelled. Evans and Peck also stated that it understood that the prepayment approach was an attempt by Powerlink to simulate the effect of a range of mechanisms to ensure on-time delivery of plant.

- Uncertainty about whether adjustments would be required for all projects of a certain type or for the duration of the next regulatory period. Evans and Peck considered that tight market conditions had emerged since the development of the historical S-curves and had, on average, resulted in increased lead times and the

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[57] Evans and Peck, *Powerlink revenue cap 2007–08 to 2011–12 AER draft decision—Adjustment of historic "S" curves to reflect tight market conditions*, January 2007.

need to apply mechanisms to ensure timely delivery for some project types. Evans and Peck considered that the tight market conditions were likely to continue over the next regulatory period, given the economic boom in Queensland and the power industry nationally.

- Using long-term contracts to manage lead times. Evans and Peck considered that PB was correct in identifying long-term contracts as an effective mechanism for ensuring delivery but stated that they do not necessarily mitigate the S-curve impact associated with tight market conditions. For instance, Evans and Peck stated that in the case of line insulators, the long-term contract resulted in earlier deliveries being assigned to projects and that consequently some project expenditure had been advanced.

TransGrid stated that its overall experience points to a tight market for the supply and erection of transmission plant. It indicated that increases in transformer costs were accompanied by substantial increases in delivery times of key items of plant—e.g. 132/66 kV transformers that were provided within a nine month time-frame are now provided in 15 months.

According to ElectraNet, the impact of lead times for equipment needs special consideration in the current construction environment.

3.7.3 AER's considerations

The AER has reviewed Powerlink's submission, Evans and Peck's report and submissions from other interested parties. The AER considers that the information received, particularly the Evans and Peck report, addresses the majority of the issues raised by PB in its original review. However, the AER notes that some uncertainty remains about whether tight supply conditions exist and, if so, the extent of the adjustment of the historical S-curves.

Evidence of tight supply conditions

Powerlink provided the AER with information on the change in lead times for different types of equipment and on its equipment ordering process. This information indicates that lead times on transformers, circuit breakers and line construction items have materially increased. Evans and Peck also stated that it had verified with a number of power transformer manufacturers that the current lead times on major power transformers had increased considerably over the last year and are still increasing. SP AusNet, ElectraNet and TransGrid supported Powerlink's claims regarding tight supply conditions.

Powerlink also provided the AER with additional information regarding its specific initiatives to mitigate the risk of increased lead times affecting project delivery. These initiatives include:

- standardisation of equipment to ensure products are able to be ordered early

- information sharing with suppliers to determine how a production facility is positioned to deliver equipment

- pre-ordering and early ordering of equipment
- up front payments.

For example, Powerlink indicated that it had recently purchased insulators in bulk earlier in the project implementation timeline than indicated in the historical S-curves. The AER agrees that some of these initiatives would advance expenditure on projects.

PB agreed that anecdotal evidence confirms the lead times for circuit breakers, current transformers and large high voltage power transformers (500/275 kV) but stated that with standard project management practices this has not led to any projects exceeding the typical project delivery timeframe. PB also stated that:

- Much of Powerlink's proposed capex is discretionary in timing because it relates to replacement or has been advanced to smooth workload or capture off peak times. PB also indicated that Powerlink has captured some degree of buffer for critical projects driven by summer demand by selecting a commissioning date of 31 October. PB considered that the general discretionary timing of projects does not warrant any adjustment to historical S-curves.
- PB considered that current tight supply conditions will abate over time. It noted that Queensland's economic and general growth is decaying, according to demand forecasts, and that transmission augmentation is particularly lumpy. It noted the heavy rate of decay of the augmentation component of Powerlink's proposed capex plan. PB also stated that it is not aware of any change in the supply side of the market for transmission plant.

The AER does not consider that Powerlink has substantial discretion over the timing of its projects because a significant proportion of its capex program relates to augmentation projects. It also notes that the purpose of staggering commissioning dates is to assist in the delivery of the capex program and that adjusting the timing of these projects to accommodate longer lead times may affect the commissioning of other projects in the capex program.

The AER asked Powerlink to provide more information on why it considers that tight supply conditions would extend over the next regulatory period. In response, Powerlink stated that recent discussions with manufacturers indicated that there is neither a slow down in orders nor any reduction in the extended lead times experienced. Evans and Peck expected that the current tight market conditions were likely to continue over the next regulatory period, given the economic boom in Queensland and the power industry nationally. Despite uncertainty about whether the current tight supply conditions will last for the entirety of the next regulatory period, the AER considers this cannot be ruled out because of the large capex programs underway in Queensland and other areas of Australia.

The AER has reviewed the additional information and analysis provided by Powerlink and Evans and Peck as well as submissions from interested parties and PB's response. While PB has some raised some issues, AER considers that on balance the information reviewed supports Powerlink's claim that:

- tight market supply conditions exist for transmission plant items
- tight supply conditions may continue for the remainder of the next regulatory period
- actions taken to ensure timely delivery (e.g. advanced ordering, bulk purchases and prepayments) are resulting in the need to advance expenditure on some types of projects.

Extent of adjustment to historical S-curves

To model the impact of tight supply conditions for some equipment, Powerlink adjusted four of its S-curves for a prepayment of up to 25 per cent. Powerlink had selected the prepayment method as yielding the S-curves it believed would best represent the business process changes it has subsequently implemented.

In the draft decision, the AER reviewed Powerlink's information about the development of its adjusted S-curves, but found that the prepayment amount of up to 25 per cent had not been justified and that it was unclear how the prepayments on manufactured items related to the adjustments made to the S-curves.

In undertaking its review of the S-curve adjustments made by Powerlink, Evans and Peck stated that it preferred to consider the impact of longer lead times on S-curves, rather than prepayments.[58] Evans and Peck developed adjusted S-curves that took into account the advancement of preliminary work required to place an earlier order of critical plant items. It based its adjustments on updated (November 2006) information from Powerlink on lead times for such equipment.

Evans and Peck found that Powerlink's adjustments to historical S-curves were warranted in the case of substation and line projects, but that the adjustments were at the high end of expectations for these types of projects. In addition, Evans and Peck also stated that it was not able to support Powerlink's adjustments to the historical transformer or capacitor project S-curves.[59]

PB made the following comments in relation to the Evans and Peck S-curves:

- The Evans and Peck adjusted S-curves extend the project timeframes for longer than 24 months. PB considered that a 24 month time-frame for most projects is a reasonable assumption. However, it acknowledged that the schedule would be a little tight for long distance transmission line projects.
- PB considered that the extension of the lead times for insulators still allows a sufficient buffer because it is unlikely that the item is on the critical path for a line project.

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58 Evans and Peck noted that Powerlink's prepayment approach was a 'catch all' mechanism reflecting the impact of project acceleration to enable advanced ordering and other mechanisms that may be required to ensure timely project delivery.

59 For capacitor projects, Evans and Peck indicated that it had no evidence that long lead items were on the critical path for completion of this type of project. For transformer projects, Evans and Peck stated that the historical S-curve was already biased to early expenditure and captured the tight supply conditions.

- The early ordering of critical items would not constitute a significant cost because these items are not generally paid for in full upfront.

The AER reviewed the process that Evans and Peck had undertaken to develop its adjusted S-curves for tight market conditions. The AER notes that the Evans and Peck S-curves have the effect of extending the construction period of transmission lines and substations beyond 24 months. Evans and Peck stated that the 24 month period is tight for substation and line projects, with average completion times commonly in excess of 24 months. It stated that increased lead times are intuitively likely to result in some expenditure being incurred ahead of the 24 month period.

Powerlink clarified that the Evans and Peck's approach is based on the preliminary work required to place an order for major plant items needing to be completed earlier than would have been the case in the absence of tight market conditions. The AER accepts the advice of Evans and Peck that the 24 month period is tight for substation and line projects based on Powerlink's experience in the recent period and notes that Powerlink has included a number of large transmission projects in its program. The AER also accepts that an increase in lead time for a critical item in the delivery of a project would extend the project beyond 24 months.

The AER also examined whether line insulators are a critical path item in the delivery of line projects. Evans and Peck assumed that most of the line hardware is required approximately halfway through the construction phase (e.g. after easement clearing and tower construction). Evans and Peck also noted that there is no significant room in the backend of the S-curve to mitigate the longer delivery times. From its review, the AER considers that insulators are a critical path item for transmission lines and that the increase in lead times would advance expenditure. Further, Powerlink has provided evidence that it now forward purchases line insulators and expects to do so in the future. This is additional evidence that Powerlink is advancing expenditure to insure that its line projects are delivered on time.

The AER notes that the Evans and Peck S-curves assume that Powerlink pays a proportion of the costs of a transformer and line insulators when the equipment is ordered. The AER sought clarification from Powerlink on whether it pays for critical path items upon delivery or prior to delivery. Powerlink advised that transformer manufacturers require a prepayment for the cost of steel, copper, tap changers and bushings at the time of placing an order.

Powerlink also advised that it pays for line insulators on delivery. The AER notes that Powerlink forward purchases its line insulators in bulk to insure against the tight supply conditions, resulting in expenditure being incurred earlier than compared with the historical S-curve for transmission lines. Given this information, the AER considers that Powerlink would incur expenditure earlier for transmission lines and substations compared with the historical S-curves.

The AER has reviewed the Powerlink and Evans and Peck approaches to adjusting historical S-curves because of tight supply conditions. The AER considers that Evans and Peck's approach to adjusting some of the historical S-curves is more robust than the approach used by Powerlink, and that Evans and Peck's adjusted S–curves should be accepted.

Conclusion

After examining the information provided by Powerlink and Evans and Peck and reviewing the comments made by PB, the AER considers that:

- there is evidence that Powerlink is experiencing increased lead times for critical transmission plant as a result of tight supply conditions
- Powerlink's historical S-curves do not take into account these tight supply conditions
- while there is some uncertainty on whether the current tight supply conditions will last for the entirety of the next regulatory period, given the large capex programs currently underway, it cannot be ruled out
- the Evans and Peck analysis of adjustments that need to be made for some of the historical S-curves is more robust than Powerlink's approach and should be accepted.

For these reasons, the AER considers that when Powerlink develops its forecast capex, it should apply the two adjusted S-curves developed by Evans and Peck for line and substation projects. Following a request from the AER, Powerlink advised that the impact of the two adjusted S-curves would be to increase Powerlink's forecast capex by $11 million, relative to its original capex proposal.

3.8 Labour escalation factors

In its revenue cap application, Powerlink proposed that the same labour cost escalator be applied to both capex and opex forecasts. Consistent with its conclusion on labour costs in the opex allowance, the AER has applied revised labour escalators developed by Access Economics to Powerlink's forecast capex allowance. Following a request from the AER, Powerlink advised that the revised labour escalators result in an increase to Powerlink's forecast capex of $2.4 million, relative to its original capex proposal. The AER's consideration of Powerlink's proposed labour escalation factors is contained in section 6.2 of this decision.

3.9 Contingent projects

3.9.1 AER's draft decision

In the draft decision, the AER approved contingent projects for Powerlink with an indicative cost of $890 million. It included seven of Powerlink's 10 proposed contingent projects as well as contingent projects for undergrounding of transmission lines and for an industrial development in Gladstone. The AER also flagged in its draft decision that it would consider including the transmission works associated with the Tugun desalination plant in the ex ante allowance for the final decision should additional information confirm that the plant would be constructed.

3.9.2 Issues raised in submissions

In its supplementary proposal and its submission on the draft decision, Powerlink provided additional information to support a proposed new contingent project and additional triggers for two contingent projects approved in the draft decision. Subsequently, Powerlink also submitted an additional contingent project based on confidential information concerning generation developments in Southern Queensland (SQ).

Specifically, Powerlink indicated that the AER should:

- treat the Tugun desalination plant as a contingent project because network planning for the supply of the plant was not sufficiently advanced to allow it to be assessed and included in the ex ante allowance
- include a contingent project for other desalination plants in SEQ in addition to the Tugun desalination plant
- include an additional trigger for the SEQ augmentation project to take into account the impact of a significant change in the timing of a potential Swanbank F generator
- adjust the trigger for the Gladstone contingent project by reducing the size of the point load required to trigger the project and by including an additional trigger for new generation projects
- include a contingent project based on a significant change in the generation pattern in SQ resulting in the need to augment network capacity between South West Queensland (SWQ) and SEQ.

DOME stated that Powerlink faces a high cumulative risk for uncertain projects given the particularly volatile, high-load growth environment within which it currently operates. It considered it would be prudent to accommodate contingent projects that may appear to be speculative, provided an appropriate trigger could be identified. DOME noted that the AER's draft decision had applied a more exacting interpretation of the possibility of the trigger event occurring during the next regulatory period than the new rules suggest. The Queensland Minister for Mines and Energy supported this view, stating that it was desirable for triggers associated with export infrastructure projects to be sufficiently broad to accommodate reconfiguration and relocation of these projects in response to changing circumstances which are out of Powerlink's control.

DOME also considered that the AER had applied the materiality threshold in the new rules to not include projects in the contingent project allowance.

3.9.3 AER's considerations

Under the transitional provisions for the Powerlink revenue reset, the AER was required to identify contingent projects and their associated triggers under the old rules and the SRP. These arrangements require contingent projects to be large and uncertain and associated with unique investment drivers.

In assessing Powerlink's proposed contingent projects, the AER:

- Used its discretion under the SRP to apply the contingent project materiality threshold in the new chapter 6A rules to establish whether a project was large.[60] The AER considered that this would provide consistency with future revenue cap decisions.

- Included projects that had unique investment drivers not considered as part of the general drivers of the probabilistic model. This was aimed at avoiding situations where expenditure may be included in both the ex ante allowance and contingent project allowance.

DOME considered that the AER's framework did not consider the cumulative risk to Powerlink of not including projects below the materiality threshold of the new rules. The AER notes that in its draft decision, it approved $890 million in contingent projects. The AER did not approve three projects with a cumulative indicative value of $52 million because they did not meet the materiality threshold. The AER does not consider that the materiality threshold exposes Powerlink to significant cumulative risk. Further, it notes that the materiality threshold for the new rules is significantly below the indicative threshold contained in the SRP.

DOME also considered that the AER applied a more stringent interpretation of the possibility of a trigger event for the contingent projects and that it would be prudent to accommodate speculative contingent projects provided an appropriate trigger could be identified. The Queensland Minister for Mines and Energy also considered that triggers for export related projects should be sufficiently broad to accommodate relocation and reconfiguration of these projects.

In the draft decision, the AER included triggers that were specific and related to an independent cost driver as set out in the SRP. The AER notes that the triggers were broadly consistent with those proposed by Powerlink. The AER also notes that the contingent project mechanism was not designed to be an insurance policy for all uncertain events that may occur during the regulatory period. This is because of the risk that the proposed expenditure on contingent projects may already be included in the ex ante allowance or may defer the expenditure for a project that has been already provided for in the ex ante allowance. This risk is more apparent under a probabilistic planning approach where there are interrelationships between projects. The AER considers that the establishment of specific triggers overcomes this risk to some extent.

When examining Powerlink's new information on the contingent projects, the AER applied the same general framework it applied in its draft decision. The AER's consideration of this information is set out below.

Tugun desalination plant

In the draft decision, the AER noted that since Powerlink had submitted its original revenue cap application, further information had become available which indicated that the Tugun desalination project was more certain of proceeding. On this basis, the AER stated that for the final decision it would consider including this contingent project in

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60 Clause 6A.8.1(b)(2)(iii) of the new rules states that a contingent project must meet a materiality threshold of the greater of $10 million or 5 per cent of a TNSP's MAR for the first year of the regulatory period.

Powerlink's ex ante allowance should additional information confirm that the plant would proceed and would require investment in Powerlink's transmission network.

In its supplementary proposal, Powerlink provided additional information on the contingent project's scope. Because of the additional load associated with the Tugun desalination plant, Powerlink advised that it would need to advance upstream transmission works.[61] The project involves advancing additional 275/110 kV transformer capacity at Mudgeeraba and advancing the 275 kV transmission line capacity into the Gold Coast/Tweed area.

Powerlink clarified that it is not seeking the inclusion of the project in its ex ante allowance because the detailed joint planning work was not sufficiently completed to allow a proper assessment of the impact on its forecast capex. As it was still assessing the required scope and costs of transmission works necessary to support the Tugun desalination plant, Powerlink proposed that this project remain as a contingent project.[62] The AER agrees with Powerlink that the project should remain a contingent project for this decision. The trigger and indicative cost of this project remains the same as in the draft decision.

The AER notes that it has already included a probability weighted amount for the Mudgeeraba transformer and the 275 kV line between Greenbank to Mudgeeraba in Powerlink's ex ante allowance.[63] Consequently, the expenditure included in the ex ante allowance should be excluded from the proposed expenditure for the contingent project.

Additional desalination plants in South East Queensland

In its supplementary proposal, Powerlink considered that further desalination plants may be established at other locations in SEQ in the next regulatory period and that the AER should include contingent projects to provide for the supply of electricity to these plants.

The AER is aware that water is an important issue in SEQ due to the ongoing drought. It is also aware of recent media reports suggesting that a second desalination plant may be developed in SEQ during the next regulatory period.

Although speculative in nature, given its importance, the AER considers that a contingent project should be included for transmission works associated with additional desalination plants in SEQ where the scope of works has not already been included in Powerlink's ex ante cap. The trigger for this contingent project is the commitment by relevant authorities to construct additional desalination plants (in addition to the Tugun desalination plant) in SEQ during the next regulatory period.

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61 The electricity demand of the Tugun desalination plant is forecast to be 32 MW by late 2008 (target commissioning date) and 64 MW by late 2010.

62 Powerlink considered the project to be a triggered contingent project. It stated that once the specifics of the project scopes and timings are finalised it would submit a formal contingent project application.

63 Powerlink indicated that the probability-weighted expenditure included in the ex ante allowance was $1.15 million for the Mudgeeraba transformer (CP.01543/A) and $10.46 million for the Greenbank to Mudgeeraba line (CP.01537).

Augmentation of supply to South East Queensland

In Powerlink's probabilistic model, it is assumed that a new generator (referred to as Swanbank F) will commence in SEQ one year after the retirement of Swanbank B in almost all scenarios. In the draft decision, the AER included a contingent project relating to the early closure of the Swanbank B generator based on information provided by Powerlink that suggested it is likely that the power station may close earlier than considered in the probabilistic model. The scope of the project includes the installation of two static var compensators in SEQ to address voltage constraints until the commissioning of the Swanbank F generator.

In its supplementary proposal, Powerlink stated that due to the high demand for electricity to be supplied in SEQ, a variation in the timing of the retirement of Swanbank B (earlier), the planting of Swanbank F (later) or both will materially increase network flows into the SEQ area across the transmission network. Under these circumstances, Powerlink considered that additional network capacity would be required to maintain reliability of supply to the area. For this reason, Powerlink proposed the inclusion of a second trigger for the contingent project relating to a delay in the timing of Swanbank F. Powerlink indicated that should both triggers occur, the required contingent project would need to be more substantial (with an indicative cost ranging from $60 million to $200 million).

The retirement of Swanbank B and the planting of Swanbank F, in general, occur one year later than in the original application due to the revised probability of generation from PNG (section 4.3). Under the probabilistic model, Swanbank B is now most likely to retire in 2011 and Swanbank F is most likely to be planted in 2012

Powerlink provided additional information indicating that the maximum secure power transfer into SEQ is limited by thermal and voltage stability limitations. It indicated that deferring the timing of additional generating capacity in SEQ would adversely affect these limitations. Powerlink stated that the proposed scope of the project to address the constraints would involve the advancement of a double circuit 500 kV line between Halys and Blackwall.

The AER has reviewed Powerlink's proposal for a second trigger for the project. The AER notes that general drivers of the probabilistic model already capture variations in timing for the commissioning of Swanbank F. Under the SRP, a contingent project needs to be associated with a unique driver that is independent of the general drivers of the ex ante allowance. The AER notes that Powerlink has not identified a unique investment driver that would cause a potential delay in the commissioning of Swanbank F beyond that accounted for in the probabilistic model.[64]

As such, the AER is of the view that Powerlink's proposed second trigger does not satisfy the criteria established in the SRP. On this basis, the AER considers that the trigger and indicative cost associated with the existing contingent project (related to the

[64] In the draft decision, the AER included a trigger for the early closure of Swanbank B power station based on information provided by Powerlink which indicated that there was potential for the power station to be decommissioned earlier for reasons not accounted for by the general drivers of the probabilistic model.

early closure of Swanbank B) should be the closure of the Swanbank B power station before 30 June 2011 without the establishment of replacement generation in SEQ.

Gladstone contingent project

In its original capex proposal, Powerlink included a load growth sub-theme (referred to as the M50++ sub-theme) in its probabilistic model to capture the effect of two 500 MW developments in the Gladstone area. In the draft decision, the AER accepted PB's recommendation to treat the expenditure related to the M50++ theme as a contingent project. The trigger for this project was an additional 500 MW development in the Gladstone area, which was not included in the 2005 demand forecasts on which the probabilistic forecast was based.

In its submission on the draft decision, Powerlink stated that:

- The trigger for the contingent project should be adjusted to a commitment of a point load of 250 MW in the Gladstone area because a point load of this size would trigger the need for a package of works referred to as the 'Gladstone transmission works'.

- Some projects associated with the Gladstone development are driven by generation developments in Central Queensland (CQ) and therefore an additional trigger should be included for the contingent project of two or more additional generating units in CQ.

The AER requested further information on the transmission works that would be required in response to a new point load of 250 MW in the Gladstone area. Powerlink stated that the transmission network supplying existing customers in the Gladstone area was heavily loaded. As a result, there is limited capacity available within the existing network to supply new customer load in this area. Powerlink noted that with the additional point load, thermal limitations would occur under system normal conditions on the Calvale to Wurdong circuit.[65]

Consequently, Powerlink considered that a 250 MW load development would require construction of a 275 kV transmission line between Calvale to Larcom Creek and an expansion of the Larcom Creek substation from three bays to eight bays to accommodate the additional circuits, capacitor banks and connections to the point load. Based on this information, the AER considers that it is appropriate to adjust the contingent project trigger to a 250 MW point load development in the Gladstone region above the 2006 demand forecasts.

The AER has also assessed Powerlink's proposed additional trigger for the project. The additional trigger relates to the commissioning of two new generation units in the Callide/Stanwell area, which would result in the need for the Calvale substation to be refurbished and the establishment of the Auburn River switching station. Powerlink indicated that these projects, which have been included in the scope of the contingent

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65 Powerlink also indicated that with a 250 MW point load, a thermal limitation would occur under contingency conditions for the Calvale to Wurdong 275 kV line, the Calvale to Stanwell 275 kV line, the Bouldercombe to Gladstone 275 kV line, the Calvale 275/132 kV transformer and the Gladstone 275/132 kV transformer.

project, are not directly related to the point load development but would be required because of new generating units at Callide. It therefore considered that if this generation locates without the point load development, it would be required to undertake some of the project scope identified in the contingent project.

The AER understands that the M50++ sub-theme was included in the probabilistic model to capture the effect of an additional point load in the Gladstone region. Because of the additional load, the model introduced new generation in the Callide/Stanwell area to cover certain scenarios relating to the M50++ sub-theme. Therefore, the AER is of the view that Powerlink's original capex proposal only considered new generation in the Callide/Stanwell area in response to the point load development in Gladstone. To be consistent with Powerlink's original probabilistic planning process, the AER does not consider that the additional generation should be included as a separate trigger for this contingent project.

Therefore, the AER considers that the trigger for the Gladstone contingent project should be a 250 MW load development in the Gladstone area that has not been included in the 2006 demand forecasts on which the updated probabilistic model was based.[66] The proposed expenditure on the contingent project should not include the expenditure on the Larcom Creek substation, which has already been provided for in the ex ante allowance.[67] The indicative cost of the contingent project remains unchanged from the draft decision.

Significant change in generation pattern in Southern Queensland

Powerlink has proposed an additional contingent project relating to a significant change in the generation pattern in SQ because of the drought and other factors. Powerlink considered that this change in generation pattern may result in materially larger transfers between SWQ and SEQ and that consequently the transmission capacity between those areas would need to be augmented.

Powerlink also considered that the change in generation pattern might require the advancement of a 500 kV development in SQ. The AER accepts there is a significant risk to Powerlink in the next regulatory period if it is required to build additional network capacity from SWQ to SEQ to supply the load in SEQ. The AER assessed whether:

- the proposed project met the materiality threshold for a contingent project
- it was related to a unique event
- Powerlink had provided evidence to suggest that the event would occur.

Based on this assessment, the AER considers that the potential augmentation should be included as a contingent project.

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66 Further discussion on the 2006 demand forecasts is set out in section 4.4.

67 Powerlink indicated that the probability-weighted expenditure included in the ex ante allowance for the Larcom Creek substation (CP.01958) was $51.1 million. The cost of the expansion of Larcom Creek substation from three bays to eight bays should be included as part of the proposed expenditure on the contingent project because it has not been provided for in the ex ante allowance.

The trigger for this contingent project relates to the announcement of a significant change in generation pattern in SQ, which would require materially higher transfers between SWQ and SEQ and for which capex would be incurred before 30 June 2012. The indicative cost of this project is $420 million. The AER notes that it has already included some probability-weighted expenditure for a project of similar scope in Powerlink's ex ante allowance. Consequently, the costs of the contingent project should not include those expenditures.

Powerlink has provided more detail to the AER about the proposed contingent project, including its need, scope and trigger. However, given the confidential nature of this information, the AER has included a more detailed analysis of this contingent project and a more specific trigger as part of appendix C of a confidential version of this decision. Should the contingent project be triggered, this information will be made public as part of the contingent project assessment under clause 11.6.12 of the new rules.

This contingent project was not included in the draft decision because it was raised with the AER only after the draft decision was made. The AER recognises there may be objections to including a confidential contingent project of this size without the benefit of public consultation, but emphasises that this is not a decision to add $420 million to Powerlink's forecast capex allowance. Should this trigger event occur, Powerlink's revenue cap will be amended only after a public process to assess the scope and cost of the contingent project.

The AER strongly prefers that its revenue cap determination is a public document, and does not take lightly the decision to include a contingent project on a confidential basis. However, there are matters of genuine commercial confidentiality that prevent the AER from making all aspects of this contingent project public. The other option is to reject this contingent project. However, given the potential scale and cost of this contingent project, a refusal to include it in this revenue cap could deny Powerlink a reasonable opportunity to comply with its regulatory obligations (National Electricity Law, section 16(2)(a)). In this case, the AER has concluded that this factor outweighs the AER's strong preference that the revenue cap determination is a public document.

Conclusion

The AER has reviewed submissions and additional information provided by Powerlink relating to contingent projects and their triggers. It concludes that:

- The transmission works associated with the Tugun desalination plant should be included as a contingent project with an indicative cost of $73 million.
- Provision should be made for a contingent project relating to the construction of additional desalination plants in SEQ (in addition to Tugun desalination plant).
- There should be no additional trigger for the SEQ augmentation contingent project.
- The trigger for the Gladstone industrial development project should be a 250 MW point load development in Gladstone, which has not been included in the 2006 demand forecasts. No provision has been made for an additional trigger for this

contingent project relating to generation developments. The indicative cost of this contingent project remains unchanged from the draft decision.

- A contingent project relating to the announcement of a significant change in generation patterns in SQ due to drought and other factors should be included as a contingent project with an indicative cost of $420 million.

The AER notes Powerlink has confirmed that the contingent projects included in the AER's draft decision may still be required in the next regulatory period and should still be included as contingent projects.

Table 3.3 shows the contingent projects identified by the AER for Powerlink's next regulatory period and their indicative costs. Appendix C sets out the projects that the AER will allow as contingent projects and their associated triggers.

Table 3.3 Contingent projects and their indicative costs ($m)

Project name	Cost
QNI upgrade (QLD component)	100
Supply to Queensland Rail for rail link	70
Augmentation of supply to South East Queensland	50
Ebenezer 275/110 kV substation	40
Nebo to Moranbah 275 kV DCST	90
Nudgee establishment and 275 kV Nudgee to Murarrie line	100
Desalination plant in South East Queensland	73
Gladstone major industrial development (M50++)[1]	170
Undergrounding costs	233
Further desalination plants in South East Queensland[2]	37
Significant change in generation pattern in Southern Queensland	420
Total indicative cost of contingent projects	1383

[1] The indicative cost for this group of projects excludes the scope of works for the Larcom Creek project which has been included in the ex ante allowance.
[2] This is an indicative amount provided by Powerlink.

In the draft decision, the AER indicated it would apply clause 6A.8.2 of the new rules once Powerlink's contingent projects had been triggered. To be clear, the AER is of the view that the regime in clause 11.6.12(f) to (i) supplants the regime set out in rule 6A.8. This means that the AER must apply clause 11.6.12(f) of Powerlink's transitional arrangements when assessing contingent projects. However, to the extent that the process set out in clause 6A.8.2 of the new rules is consistent with clause 11.6.12(f), the AER will endeavour to follow that process.

In particular, the AER expects Powerlink to provide the information required by clause 6A.8.2(b)(3) when applying for the approval of a contingent project (this information will be required to undertake the assessment required by clause 11.6.12(f)). The AER will endeavour to assess the application in accordance with clauses 6A.8.2(c)–(d). Finally, while the 90 business day limit in clause 6A.8.2(b)(1) does not apply to

Powerlink, the AER will be unable to approve an amendment to a revenue cap from the beginning of a regulatory year if the application is not received in sufficient time to enable the AER to make its decision and to enable prices for that regulatory year to be published by 15 May (in accordance with clause 6A.24.2). Accordingly, if Powerlink wishes to apply to amend its revenue cap from the beginning of the next regulatory year because of a contingent project being triggered, the AER will need to receive Powerlink's application at least 30 business days prior to the 15 May deadline for publishing prices.

3.10 AER's conclusion

This section sets out the AER's conclusion on the forecast capex allowance for Powerlink, based on an assessment of its original capex proposal for the next regulatory period. In summary, the AER's conclusion on an efficient ex ante allowance for Powerlink is $2249 million ($2006–07). It has also included 11 contingent projects with a total indicative cost of $1383 million. This compares with the draft decision, which contained an ex ante allowance of $2032 million and nine contingent projects with a total indicative cost of $890 million.

In reaching its conclusion, the AER addressed a number of issues raised by Powerlink and other interested parties. Specifically, the AER concludes that:

- Powerlink's load driven capex should be reduced by $64 million. This compares with the AER's draft decision, which considered that Powerlink's load driven capex should be reduced by $127 million.

- Powerlink's replacement expenditure based on its original capex proposal, less $2.9 million, should be included in the ex ante allowance. This compares with the AER's draft decision, which considered that Powerlink's replacement expenditure should be reduced by $111 million.

- Powerlink's security and compliance expenditure should be reduced by $13 million and its business IT project allowance should be reduced by $4.1 million. This is consistent with the draft decision.

- Powerlink's forecast capex estimates should be based on revised labour escalation rates developed by Access Economics, adjusted S-curves developed by Evans and Peck, and Powerlink's proposed cost estimation risk factor of 2.6 per cent. These adjustments result in a net increase of $13 million in capex.

- Two new contingent projects should be included, one relating to additional desalination plants in SEQ and another relating to a significant change in generation patterns in SQ.

Table 3.4 sets out the AER's conclusions on Powerlink's ex ante allowance for the next regulatory period based on the original capex proposal. It shows Powerlink's original proposed ex ante allowance and the adjustments made by the AER to arrive at its conclusion on an efficient forecast capex allowance. The total adjustments represent a reduction of $200 million over the next regulatory period.

Table 3.4 AER's conclusion on Powerlink's forecast capex allowance based on the original proposal ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's capex proposal	546.31	543.02	456.10	466.49	437.32	2449.24
Adjustments resulting from detailed project reviews[1]	–21.65	–66.51	3.61	16.89	–13.23	–80.90
Adjustment to replacement expenditure	–	–	–0.19	–0.73	–2.01	–2.93
Adjustment to undergrounding costs[2]	–10.36	–14.08	–13.46	–6.22	–69.76	–113.88
Transfer of M50++ to contingent projects[2]	–1.25	–13.66	–4.16	2.37	1.44	–15.26
Adjustments to cost accumulation factors	14.41	4.17	5.73	–24.13	12.34	12.52
AER's total adjustments	–18.84	–90.08	–8.47	–11.82	–71.22	–200.44
AER's ex ante capex allowance	527.47	452.94	447.63	454.67	366.10	2248.80

[1] These adjustments relate to load driven, security and compliance, and non-network projects.
[2] These adjustments involve the removal of probability weighted expenditure from the ex ante allowance. This is consistent with the draft decision.

The AER's conclusion on Powerlink's total ex ante allowance, based on its assessment of Powerlink's original capex proposal and the supplementary proposal, is set out in section 4.11.

4 Supplementary capital expenditure proposal

4.1 Introduction

On 15 December 2006, the AER received a supplementary revenue cap proposal (supplementary proposal) from Powerlink seeking an additional capex allowance of $469 million ($2006–07) based on updated information.[68] The AER's draft decision was made before receiving the supplementary proposal and therefore did not take into account this information. The revised total amount of capex being sought by Powerlink is $2918 million. Powerlink also advised the AER that it accepted a number of adjustments made in the draft decision which resulted in a reduction of $165 million.[69]

Powerlink's supplementary proposal identified the need for additional capex based on:

- higher input costs for assets under construction and future capital projects
- changes in the probability of network upgrades due to generation associated with the Papua New Guinea (PNG) pipeline not proceeding within the next regulatory period
- advancement in the timing of some forecast capex projects due to higher demand forecasts
- an additional high speed monitoring project to satisfy a National Electricity Market Management Company (NEMMCO) requirement.

This chapter sets out the AER's consideration of these issues as well as a number of other issues raised in Powerlink's supplementary proposal. The AER engaged PB as a technical expert to review a number of key aspects of Powerlink's supplementary revenue proposal.[70] The AER has taken account of this advice in forming its conclusions on the supplementary proposal.

4.2 Update to capital cost estimates

4.2.1 Cost increases for assets under construction

Powerlink's proposal

The change in approach to the recognition of capex has seen Powerlink include expenditure in its forecast capex proposal that resulted from projects under construction as at 30 June 2007. Powerlink has updated the capital cost estimates for those projects

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68 Due to the inter-related nature of these adjustments, Powerlink advised that the sequence of the review was: adjustments for higher input costs associated with assets under construction and forecast capex projects; adjustments for changes to generation from PNG gas; and adjustments for higher demand forecasts. The NEMMCO HSM project does not impact on the sequence of the review.

69 The draft decision adjustments included in Powerlink's revised capex proposal are: undergrounding costs transferred to contingent projects; Central Queensland–South Queensland projects review; transfer of M50++ sub-theme set to contingent projects; and use of specific locality factors for capacitor bank projects.

70 PB Associates, *Powerlink revenue reset–review of Powerlink's supplementary submission*, June 2007.

to reflect recent input cost increases. Powerlink stated that since its original estimates were prepared (during late 2005 and early 2006) the cost of tower steel increased by at least 15 per cent, copper by 100 per cent and aluminium for conductors by 40 per cent. As a result, it claims that the capital costs for these projects are now significantly higher than previously estimated. Powerlink stated that these cost increases arose from factors outside its control and are indicative of the well publicised cost increases currently being experienced in other industries.

Powerlink has modelled the impact of these cost increases on its assets under construction to be $156 million and the profile of these additional expenditure requirements over the next regulatory period is shown in table 4.1.

Table 4.1 Powerlink's additional capex requirement due to input costs increases for assets under construction ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	88.01	61.77	6.11	–0.22	–0.09	155.58

Note: The negative amounts in 2010–11 and 2011–12 are because re-estimating several projects has resulted in reduced annual expenditures. In these years, where overall expenditures for assets under construction are very small, summation has resulted in small negative totals.

PB's review

PB stated that the cost increases have generally resulted from the current volatility in the cost of raw materials—including copper, aluminium and steel—as well as the tight market for skilled labour, which it considered to be a consequence of the current mining boom in Australia, particularly Western Australia and Queensland. PB noted that metal prices peaked in early 2006 and that total labour costs, particularly indirect labour costs, were under upward pressure which lent support to revising the total estimated project costs for assets under construction as proposed by Powerlink.

PB reviewed the three methodologies used by Powerlink to re-estimate the total costs of assets under construction and found them reasonable and auditable.[71] PB found that each method appeared to be appropriate for the type of project to which it had been applied. PB also undertook a detailed review of four of Powerlink's assets under construction projects in order to review the full range of cost estimating methodologies used by Powerlink.[72] PB found that when revising the total project estimates Powerlink had applied the appropriate methodology consistently.

Based on its review of the methodologies and actual projects, PB considered that the increase (as estimated by Powerlink) in forecast capex during the next regulatory period for projects currently under construction was reasonable, and recommended that it be accepted. However, PB recommended that the amount of $156 million proposed by Powerlink should be amended to remove a contingency allowance ($0.16 million)

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71 The three methodologies were target cost estimate, general percentage increase for line projects and BPO (unit cost) estimate update.

72 The projects were CP.1087, CP.1294, CP.1134 and CP.1138. The latter project was the typical lines project used by Powerlink to determine the 16 per cent increase applied to other lines projects in the early stages of construction.

included in the revised estimate for project CP.1087. Powerlink acknowledged that a contingency allowance had been incorrectly applied to this project and agreed that it should be removed.[73] Therefore, PB recommended an increase of $155 million should be made to Powerlink's capex allowance in the next regulatory period as shown in table 4.2.

Table 4.2 PB's recommendation on additional capex due to input costs increases for assets under construction ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	88.01	61.77	6.11	–0.22	–0.09	155.58
PB's adjustment	–0.16	–	–	–	–	–0.16
PB's recommendation	87.85	61.77	6.11	–0.22	–0.09	155.43

AER's considerations

The AER has reviewed the submissions, information provided by Powerlink and the PB report and has confirmed that input costs increased substantially during the period in which these projects have been under construction. In addition, the PB review confirms that the application of costing methodologies has been appropriate and consistent, ensuring that the most recent input costs are reflected in project cost estimates.

The AER agrees with PB that prices for base metals (such as copper and aluminium) and labour costs have risen from earlier cost estimates, and have affected Powerlink's projects currently under construction. Information provided by Powerlink on the PB review of current projects indicates that the cost increases largely reflect current high prices for inputs such as base metals. The AER considers there is evidence that the cost of manufactured electrical equipment reflects changes in base metal prices.

In the draft decision, the AER noted that Australian Bureau of Statistics (ABS) data on the producer price index (PPI) indicated that increasing base metal prices have flowed through to prices for intermediate and final stages of electrical equipment production.[74] The AER updated its review of this data to include the indices for copper materials used in the manufacture of electrical equipment such as distribution and transmission power transformers. The data shows that there has been an average annual increase in prices of 26 per cent and 23 per cent respectively, from March 2005 to March 2007.[75]

An examination of these data indices also indicates that there does not appear to be a major lag in the price of manufactured electrical equipments to reflect changes in base metal prices.[76] The data from the ABS confirms that price increases in manufactured electrical equipment have followed base metal prices. Based on a review of this material, these increases are likely to affect costs associated with Powerlink's assets

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73 Powerlink's project estimates do not include contingency allowances.

74 The ABS is the national statistical agency. It collects, compiles, analyses and disseminates a wide range of statistics.

75 ABS, *Producer Price Index, 6427.0*, March 2007, table 47.

76 The high electrical equipment PPIs were within three months of the high base metal spot prices.

under construction program. The AER, however, notes that there is not a one-for-one flow through of increased metal prices to manufactured equipment.

Conclusion

Overall, the AER accepts PB's recommendation that the increase in forecast capex on projects currently under construction is reasonable. Therefore, the AER will approve an additional amount of $155 million for capex due to input cost increases associated with Powerlink's assets under construction (see table 4.3). As agreed by Powerlink, this amount has been adjusted for $0.16 million to remove a contingency allowance included in a revised estimate for the Bohle River project (CP.1087).

Table 4.3 AER's conclusion on additional capex due to input costs increases for assets under construction ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	88.01	61.77	6.11	–0.22	–0.09	155.58
Bohle River project adjustment	–0.16	–	–	–	–	–0.16
AER's conclusion	87.85	61.77	6.11	–0.22	–0.09	155.43

4.2.2 Cost increases for future projects

Powerlink's proposal

Powerlink stated that since project cost estimates were prepared for its original revenue cap application (at the end of 2005 and early 2006), the cost of tower steel and aluminium (used in line conductors) has increased by up to 25 per cent. It considered that cost estimates for all future projects are now higher than previously forecast due to factors outside of its control. As a result, Powerlink has updated its cost estimates for all future projects (using revised unit costs developed in June 2006) to reflect recent increases in input costs. Powerlink has modelled the impact of these revised unit costs on its forecast capex requirements to be an increase of $126 million. The profile of this additional capex is shown in table 4.4.

Table 4.4 Powerlink's additional capex requirement due to input costs increases for future projects ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	10.37	24.97	30.40	32.71	27.06	125.52

PB's review

PB was required to assess whether the revised unit costs were efficient for projects that commence in the next regulatory period having regard to whether the project costs are likely to be higher or lower than the revised estimate.

PB indicated that in its review of Powerlink's original revenue cap application, it had concluded that the base planning objects (BPOs) used by Powerlink to estimate the cost of future projects were appropriate and benchmarked well with other publicly available

cost information.[77] It noted that Powerlink's BPOs were based on data current as at October 2005 for substation BPOs and February 2006 for line BPOs.

PB found the process used by Powerlink to revise the BPOs in June 2006 was objective, appropriate and auditable. However, while PB supported the use of the higher BPOs for estimating the costs of projects currently under construction, it did not support the application of these same BPOs to forecast the cost of projects that have not yet commenced. It noted that metals prices had declined from the peaks in 2006 and the prices of futures metal contracts indicate that these reductions are likely to continue.

Overall, PB considered that the BPOs used to develop Powerlink's original revenue cap application more appropriately reflected the costs Powerlink was likely to experience over the next regulatory period when escalated in accordance with the recommendations contained in section 4.8 of PB's original report. Therefore, PB did not support Powerlink's proposal to increase its forecast capex allowance by $126 million based on revised BPOs developed in June 2006 (table 4.5).

Table 4.5 PB's recommendation on additional capex due to input costs increases for future projects ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	10.37	24.97	30.40	32.71	27.06	125.52
PB's adjustment	–10.37	–24.97	–30.40	–32.71	–27.06	–125.52
PB's recommendation	0	0	0	0	0	0

AER considerations

BPO update process

PB found that to develop the revised BPOs Powerlink had broken down each BPO into its basic components such as aluminium, copper, steel, concrete poles, establishment costs, internal labour and external labour. The process involved updating metal indices[78] and labour rates to the values of the day and then checking the outcome to ensure that the updates produce cost estimates in line with current estimates received from construction contractors.[79]

Powerlink provided PB with detailed cost estimates for two typical projects, a lines project and a substation project. For each of these projects, two estimates were provided—one based on the BPOs used for the original revenue cap application and another based on the revised BPOs. PB stated that the revision to the BPOs resulted in a 6.8 per cent increase in the lines project and a 12.7 per cent increase in the substation project. PB found that Powerlink had developed the revised BPOs using an objective

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77 Powerlink's BPOs underpin the majority of its project cost estimates. These are essentially unit rates for different asset types including switchyard bays, transformers and transmission lines.

78 Indices from the London Metal Exchange are used to update copper and aluminium prices and the CRU International Steel Price Index Futures (CRU spi) is used for steel.

79 Labour rates and conditions are also updated to reflect current award rates and current indirect costs such as site allowances, accommodation expenses and travelling allowances.

and auditable process, and that it had produced estimates that reflected current costs. The AER accepts PB's finding that the process for updating the BPOs was appropriate.

Input cost increases

A key element of the BPO update process involves the use of revised metals indices for aluminium, steel and copper. As part of its review of cost increases for projects commencing in the next regulatory period, PB examined price projections regarding base metals such as copper, aluminium and steel. It referred to the London Metal Exchange (LME) charts included in its review of Powerlink's original revenue cap application. It also referred to two other sources of information it considered confirmed the trends evident in the price history charts obtained from the LME—namely, the Australian Bureau of Agricultural and Resource Economics' (ABARE) *Australian Commodities* report and Comex weekly aluminium and copper prices.[80] PB stated that the Comex information shows that aluminium and copper prices peaked in 2006 and were now coming off their peak levels. It also referred to ABARE's December 2006 Australian Commodities report, which forecasts that aluminium and copper prices will fall by 11 per cent and 8 per cent respectively in 2007, and that steel prices are expected to fall marginally in 2007.

PB considered that the information it had obtained indicates that metals prices have now declined from the highs in mid 2006 and that the prices of futures metal contracts indicate that these reductions are likely to continue. PB stated that forecasting futures metal prices was difficult and acknowledged that forecasters have a poor record. However, it did not consider that this justified locking in high prices when estimating future project costs, particularly when the available evidence suggests that prices are likely to fall. PB stated that it could not support the application of the revised (June 2006) BPOs to forecast the cost of projects not yet commenced.

The AER has examined PB's finding that the high metals prices of 2006 will return to long-term averages over the next regulatory period. In doing so, the AER recognises that metals price forecasting is difficult. Consequently, it has reviewed the base metals price forecasts developed by ABARE, the International Monetary Fund (IMF) and the World Bank. The AER considers that ABARE, the IMF and the World Bank are reputable sources because they are independent organisations with the appropriate expertise and the information is transparent and publicly available.[81]

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80 LME is the world's premier non-ferrous metals market with highly liquid contracts and a turnover in excess of US $4500 billion per annum.
Comex refers to the Commodities Exchange, one of the two divisions of the New York Mercantile Exchange Inc.

81 ABARE has a wealth of expertise in applied economic research. It uses the latest modelling techniques and has extensive corporate databases. In the case of base metals, ABARE collects Australian data directly from mining companies and sources international data from the International Copper Study Group and the World Bureau of Metal Statistics among others. ABARE publishes quarterly base metal price forecasts in its report *Australian Commodities*.
In its 2006 *World Economic Outlook*, the IMF reviewed whether the recent boom in non-ferrous commodity prices would be sustainable. As part of this review, the IMF developed two parallel models to forecast aluminium and copper prices. The IMF based its two models on four integrated components, the demand, supply, prices and industrial production of each metal.
The World Bank commissioned the CRU Group to prepare a five year outlook for base metal prices. CRU is an independent business analysis and consultancy group focussed on the mining, metals, power, cables,

In March 2007, ABARE released its quarterly Australian Commodities report.[82] The report projects that over the medium term, both aluminium and copper production is expected to exceed consumption, resulting in a steady increase in stock levels and placing downward pressure on prices for these commodities. Table 4.6 contains ABARE's 2007 to 2012 price projections for both aluminium and copper. The table shows that aluminium prices are expected to decline by 29 per cent while copper prices are expected to decline by 38 per cent.

Table 4.6 ABARE's projections for aluminium and copper prices for 2007–12 ($US/ton, nominal)[83]

	2007	2008	2009	2010	2011	2012
Aluminium	2350	2085	1975	1838	1763	1663
Copper	5550	5050	4650	4275	3850	3450

The IMF and the World Bank both published reports in September 2006 that support ABARE's projections. The IMF developed models, encompassing supply and demand factors, for aluminium and copper price forecasts. The IMF's modelling suggests that annual average prices of aluminium and copper will decline from current levels by 35 per cent and 57 per cent respectively by 2010.[84] Similarly, the World Bank forecast that increased copper and aluminium production leading to increased stock levels would result in declining prices for these metals.[85] Figure 4.1 shows the IMF's price forecasts for aluminium and copper for 2007 to 2011. Figure 4.2 shows the World Bank's price forecasts of these metals for 2007 to 2010.

Publicly available information concerning forecasts of steel prices is more difficult to obtain. The AER is aware that steel, particularly the product called steel longs, is an important input used by Powerlink in constructing transmission towers. In the absence of publicly available information on steel price forecasts, the AER's review has focused on the raw materials used in the production of steel and anticipated steel demand, production and consumption.

Recent high steel prices have been driven by significant increases in the costs of inputs, especially iron ore and coal. Iron ore contract prices have experienced their fifth consecutive year of price increases. ABARE stated that rising iron ore prices have stimulated substantial investment in new production and transport capacity, which is expected to produce at full capacity in 2008. This increase in supply of iron ore, coking

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fertiliser and chemical sectors. CRU Group's research and expertise encompasses over 80 countries, with specialisation in all major metals and related commodities. The World Bank report provides detailed analysis of supply, demand, stocks, and short, medium and long-term prices.

82 ABARE, *Australian Commodities*, vol 14. No. 1, March quarter 2007, pp. 132-151.

83 ibid., pp. 133 and 146.

84 IMF, *World Economic Outlook – Financial Systems and Economic Cycles*, September 2006, p. 149.

85 World Bank, *Background Paper – The Outlook for Metals Markets Prepared for G20 Deputies Meeting Sydney 2006*, September 2006, pp. 9-11.

and metallurgical coal is projected to contribute to an easing of prices over the medium term.[86]

Figure 4.1 IMF's aluminium and copper price projections for 2006–11 ($US cents per pound, real)[87]

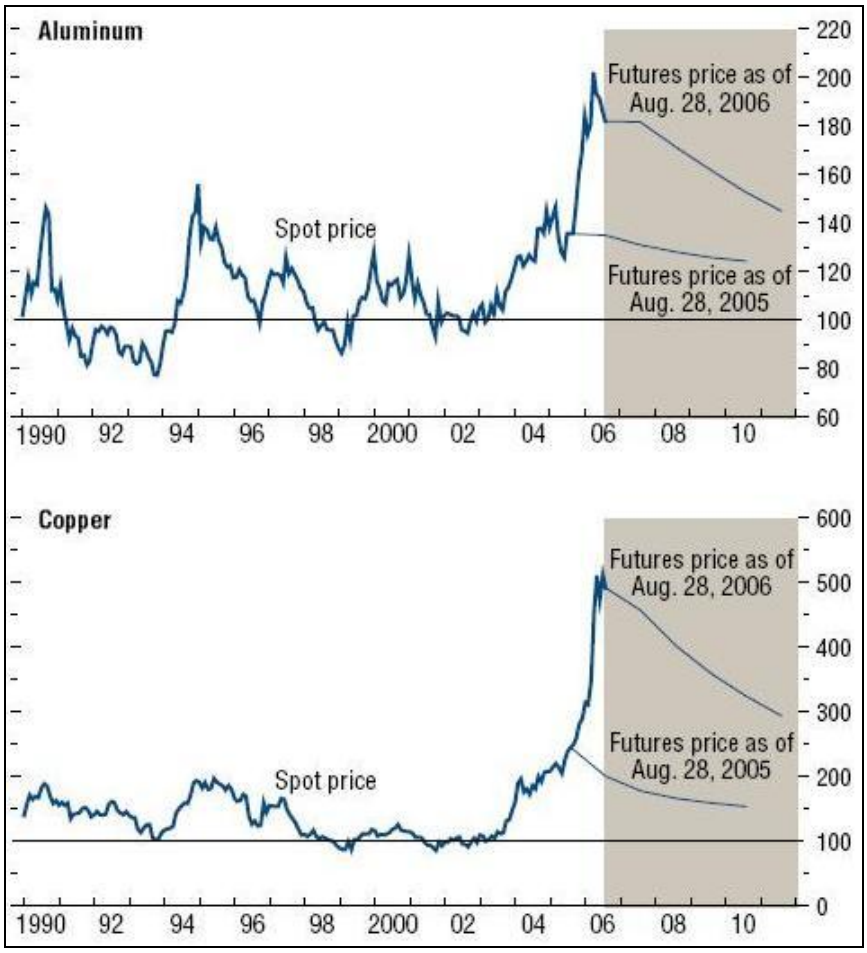
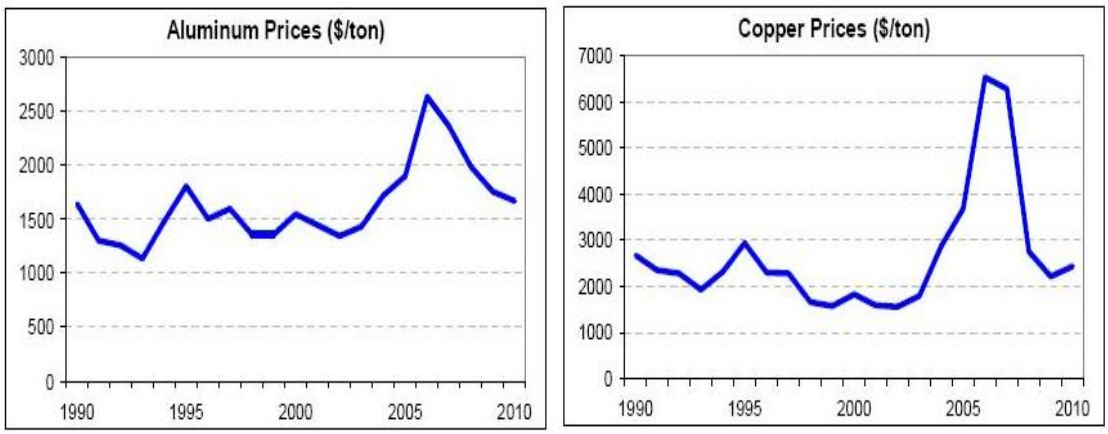


Figure 4.2 World Bank's aluminium and copper price projections for 2007–10



86 ABARE, *Australian Commodities*, vol 14. No. 1, March quarter 2007, pp. 111-112.

87 The IMF's report sources these graphs from Barclays Capital *Commodity Daily Briefings*, 19 July, 23 and 29 August 2006; Bloomberg Financial Markets; IMF commodity price system database; and IMF calculations.

The International Iron and Steel Institute (IISI) forecasts that world steel demand over the medium term is expected to grow by 4.9 per cent per annum up to 2010 and by 4.2 per cent per annum to 2015.[88] This compares with world demand growth of 8.5 per cent in 2006.[89]

ABARE has projected iron ore, coking and metallurgical coal prices to decline over the medium term and for there to be no significant divergence between world steel production and consumption. The IISI forecast is for moderate to low growth in the world steel demand. The AER considers there is sufficient material pointing to lower costs in production of steel and moderate world demand in the medium term, and that it is reasonable to expect these factors to result in a softening in the future price of steel.

The AER's analysis supports the PB view that base metal prices are likely to decline from current high levels over Powerlink's next regulatory period and that it is reasonable for the AER to accept PB's recommendation that the use of the revised BPOs is not appropriate to forecast capex over the next regulatory period. However, recognising the uncertainty associated with forecasting and the possibility that high metal prices could persist a little longer than expected, the AER considers that a reasonable approach is to allow Powerlink to use its revised BPOs for some of its future projects. The AER will accept the cost estimates of future projects that commence construction in 2007–08 being based on the revised BPOs. Based on the best available information, the AER considers that this approach provides for a transition from current high metal prices to projected lower metal prices. For future projects in the remaining four years of the next regulatory period, it is reasonable to maintain the use of the cost estimates based on the original BPOs in the draft decision as they more appropriately reflect the costs likely to be experienced by Powerlink in that period.

In its submission, Powerlink referred to comments by Access Economics that a decline in base metal prices would lead to a proportionate depreciation of the Australian dollar relative to the United States dollar. Powerlink stated that because metal prices are generally denominated in US dollars, any potential gain as a result of declining commodity prices would be offset by the fall in the Australian dollar.

Australia, as a prominent commodity producer, is historically regarded to have a 'commodity currency' (i.e. the Australian dollar is assumed to be a function of commodity prices). In the past, there has been a recognised correlation between the movements in the Australian dollar and commodity prices, which can be seen in figure 4.3. However, recent research data points to a divergence in this relationship since 1999, when the Australian dollar depreciated while at the same time the Reserve Bank of Australia's (RBA) index of commodity (base metal) prices increased.[90]

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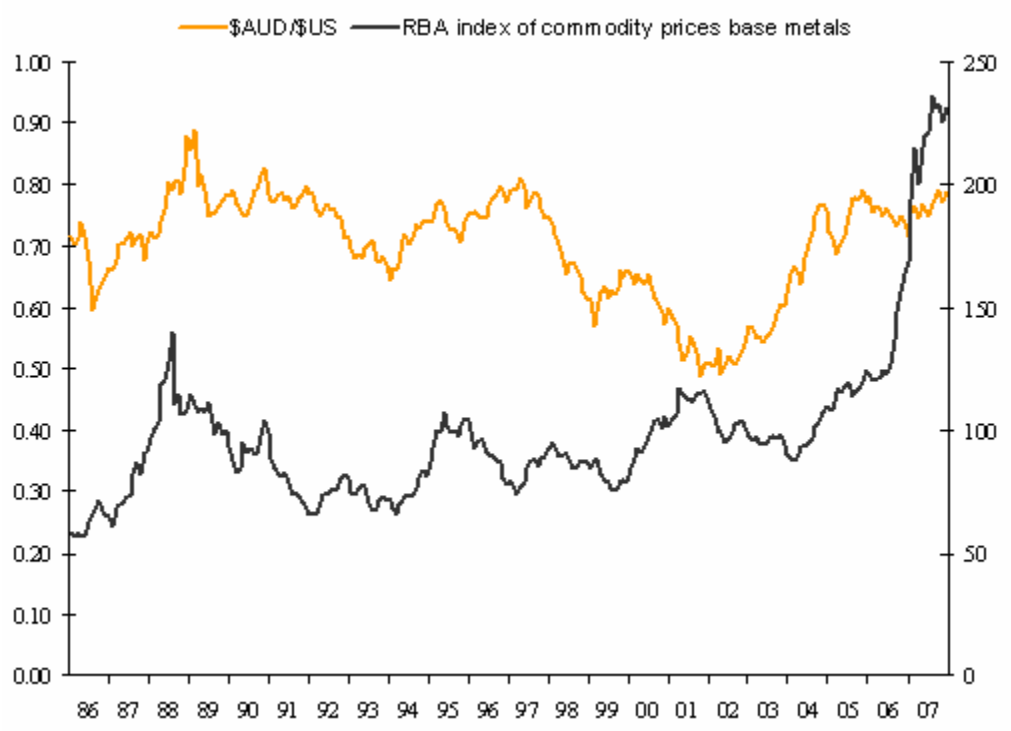
88 The IISI is one of the largest industry associations in the world. It is a non-profit research organisation and represents over 190 steel producers (including the world's 20 largest steel companies), national and regional steel industry associations, and steel research institutes. IISI members produce around 60 per cent of the world's steel.

89 International Iron and Steel Institute, *IISI short range outlook and medium term forecast—Steel news, Media release*, 2 October 2006.

90 The RBA is an active participant in financial markets, manages Australia's foreign reserves, issues Australian currency notes and serves as banker to the Australian Government. Its main responsibility is monetary policy, with the objective of achieving low and stable inflation over the medium-term.

Figure 4.3 The Australian dollar relative to RBA index of commodity prices



Source: RBA, Index of commodity prices (G05) and exchange rates (F11).

Academic research on this topic lends support to the view that a broad range of factors, not just base metal prices, influences the Australian dollar. An RBA paper stated that there was some evidence to suggest that the terms of trade, the long-run real interest rate differential and net foreign liabilities influence the long-run equilibrium level of the Australian dollar.[91] It concluded that these factors appear to explain broad trends in the real exchange rate reasonably well.[92] Similarly, Makin found that the major influences on the Australian dollar were Australia's inflation performance relative to that of its major trading partners, its terms of trade, short-term international capital flows and monetary policy.[93]

More recently, ABARE noted that the strength of the US dollar relative to other currencies has been a major factor in the movement of the Australian dollar.[94] Access Economics also noted that the Australian dollar has long been tagged a commodity currency and broad trends in commodity prices have been reflected in the Australian dollar.[95] It stated, however, that this relationship has diverged in recent times as commodity prices continued to rise. While Access Economics expected commodity

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91 Blundell-Wignall, Fahrer and Heath, *Major Influences on the Australian Dollar Exchange Rate*, *RBA 1993 Conference, The Exchange Rate, International Trade and the Balance of Payments*, 22 October 1993.

92 ibid., p. 66.

93 Makin, T, *The Main Determinants of Australia's Exchange Rate*, *The Australian Economic Review*, vol. 30, no. 3, 1997, pp. 329-339.

94 ABARE, *Australian Commodities*, vol 14. No. 1, March quarter 2007, pp. 17-18.

95 Access Economics, *Minerals monitor*, March 2006, pp. 16-17.

prices to decrease, it stated that the matching move in the Australian exchange rate is forecast to be much more muted.

Based on the information it has reviewed, the AER considers that there is not a direct relationship between base metal prices and the Australian dollar. The relationship is much more complex and influenced by other factors such as movement in interest rates, international capital flows, performance of other sectors in the domestic economy and the outlook of world economies. To the extent that falling metal prices coincides with a smaller proportional depreciation of the Australian dollar, it would still result in savings from the purchase of materials settled in Australian dollars.

Conclusion

The AER has reviewed submissions from Powerlink and other interested parties, PB's report and other publicly available information. It considers that there is sufficient information that supports PB's view that input costs, particularly high metal prices, are expected to fall over the next regulatory period. Based on the best available information, the AER considers that the BPOs used in Powerlink's original revenue cap application more appropriately reflect the costs likely to be experienced by Powerlink over the next regulatory period. That is, the original BPOs are expected to provide a more reasonable base cost estimate for Powerlink's future capex projects.

However, recognising the uncertainty associated with forecasting and the possibility that high metal prices could persist a little longer than expected, the AER will allow Powerlink to use the revised BPOs for estimating the cost of future projects that commence construction in 2007–08. For future projects in the remaining four years of the next regulatory period, it is appropriate to maintain the use of the cost estimates based on the BPOs in the draft decision. Following a request from the AER, Powerlink advised that the AER's conclusion would result in an additional $37 million to capex due to input cost increases for future projects (table 4.7).

Table 4.7 AER's conclusion on additional capex due to input costs increases for future projects ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	10.37	24.97	30.40	32.71	27.06	125.52
AER's adjustment	–	–3.80	–24.57	–32.71	–27.06	–88.14
AER's conclusion	10.37	21.17	5.83	–	–	37.37

The application of escalation factors for materials, property and labour provides for increases to the base cost estimates of forecast capex projects. The AER's draft decision accepted Powerlink's proposed escalators for materials and property and, in this decision, the AER has not changed its position. The AER's further consideration of the appropriate labour escalation factors to be applied to Powerlink's capex and opex is set out in section 6.2.

4.3 Generation from PNG gas pipeline project

4.3.1 Powerlink's proposal

Powerlink considered the potential for generation resulting from the development of the PNG gas pipeline project when determining its original forecast capex by including the PNG gas pipeline theme set in its probabilistic model. Powerlink's original forecast capex proposal was developed using scenarios that assigned a probability of 50 per cent to the development of generation in the Townsville area as a result of the pipeline proceeding.[96]

Since the submission of Powerlink's original application, a number of events have adversely affected the PNG gas pipeline project. This led Powerlink to consider that the PNG project would not result in any generation developments in the Townsville area during the next regulatory period. As a result, Powerlink believed that the PNG theme set should now be assigned a zero per cent probability, and that this revised probability should see a reassessment of its forecast capex.

Accordingly, Powerlink has recalculated its forecast capex requirements based on the zero probability of the generation associated with the PNG gas pipeline proceeding during the next regulatory period. It calculated that the change resulted in a net increase in capex of $57 million as shown in table 4.8.

Table 4.8 Powerlink's additional capex requirement due to impact of revised probability of generation from PNG gas pipeline ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	–0.25	2.60	36.17	18.39	–0.13	56.78

4.3.2 PB's review

PB was required to assess whether the increase in Powerlink's proposed forecast capex allowance based on the revised probability of generation from the PNG gas pipeline project was appropriate and efficient. In particular, PB was required to comment on whether a zero per cent probability for the PNG gas generation scenario was reasonable and to assess whether there were any other possible alternative generation developments that may occur in the Townsville area during the next regulatory period.

PB found that:

- It was reasonable that Powerlink modified the probability of the PNG theme set to zero in determining its probability weighted forecast capex. PB based this finding on recent announcements by PNG project participants regarding their agreement to evaluate other alternatives for PNG and to suspend work on the pipeline project in Australia.

[96] A new 400 MW combined cycle gas turbine (CCGT) generator was modelled in Townsville South in 2010–11 under all PNG scenarios. The PNG pipeline also increased the likelihood of other generation projects, including a 400 MW CCGT at Esk and a 400 MW CCGT in Gladstone.

- In general, Powerlink's approach to adjusting the probabilities of the weighting of the PNG theme set to determine an efficient revised expenditure profile was reasonable.

- While Powerlink could have followed the process used in the original application to moderate its scenario probabilities, it agreed that the approach adopted was pragmatic given the time constraints, and reflected a good approximation of the more detailed moderating approach undertaken by ROAM Consulting (ROAM) for the original capex proposal.

- PB's detailed review of the Strathmore to Ross project indicated that the increased probability of the project was a reasonable outcome.

- The final adjustment to the probabilities, which was aimed at maintaining some characteristics of the original PNG theme set, was unnecessary and should not be made.

Overall, PB recommended that Powerlink's proposed additional capex, from the revised probability of generation from the PNG gas pipeline project, be reduced by $10 million from $57 million to $47 million (table 4.9). A more detailed discussion of PB's findings is contained in section 4.3.3.

Table 4.9 PB's recommendation on additional capex due to impact of revised probability of generation from PNG gas pipeline ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	–0.25	2.60	36.17	18.39	–0.13	56.78
PB's adjustment	–3.20	–2.65	–0.64	–1.94	–1.55	–9.98
PB's recommendation	–3.45	–0.05	35.53	16.45	–1.68	46.80

4.3.3 AER considerations

Likelihood of generation in North Queensland

Powerlink submitted that there should be a reduction in the probability of generation from PNG gas of 50 per cent to zero per cent. The revised probability will affect the likelihood of a new generation project in Townsville.[97] Powerlink indicated that this change would result in the need for more augmentation between Central Queensland (CQ) and North Queensland (NQ) and less augmentation between CQ and Southern Queensland (SQ).[98] As such, the likelihood of a new generation project in the Townsville region has a material impact on Powerlink's capex requirements.

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97 To a lesser extent, the absence of the PNG gas pipeline reduces the probability of new generation projects in Esk and Gladstone.

98 This is because more generation would need to be dispatched from Central Queensland to North Queensland in the absence of a generator in Townsville. Further, the non-PNG scenarios assume more generation in South West Queensland which would increase the flow of generation from this region into Southern Queensland. This would decrease the need for generation to be dispatched from Central Queensland to Southern Queensland.

Under Powerlink's original revenue cap application, a generator is located in Townsville under all PNG scenarios and non-PNG high-growth scenarios. A key outcome of Powerlink's review of generation from the PNG gas pipeline is that the Townsville generator only proceeds under high-growth scenarios because it assumes that an alternate source of gas would only eventuate under high-growth scenarios. The AER has assessed whether the Townsville generator may still proceed under medium and low-growth scenarios and reduce the need for the proposed increase in capex.

Since its original application, Powerlink considered that significant adverse developments had affected the likelihood of the PNG gas pipeline construction. These adverse developments include the inability of the proponent to secure firm contracts, an increase in the cost of the project, the Australian Gas Light's (AGL) withdrawal from the front-end engineering and design activities, and the proponent's consideration of either a staged development or an alternative route.

Powerlink sought ROAM's view on the likelihood of the pipeline proceeding within the next regulatory period and, more generally, on the impact of generation development within the Townsville region.[99] ROAM considered that the likelihood of the PNG project supplying gas to Townsville before the end of the next regulatory period was sufficiently remote as to warrant a zero per cent probability in Powerlink's planning processes. However, ROAM considered that it was appropriate for the Townsville generator to remain as a project under the scenarios where demand remains at its highest irrespective of whether they also contain the PNG gas pipeline.

During its review, PB noted that Oil Search Limited, the major participant of the PNG project, had released a press statement that project participants had agreed to suspend work on the PNG pipeline and pursue alternative developments.[100] Based on Oil Search's announcement and the views of both ROAM and Powerlink, PB considered that it was reasonable for Powerlink to reduce the probability of the PNG gas theme to zero in determining its probability weighted forecast capex. The AER accepts this conclusion.

The AER also investigated whether there were any other viable sources of gas to supply a new generator in Townsville during the next regulatory period. It noted that:

- The Moranbah Gas Project (MGP) supplies gas to Townsville through the North Queensland gas pipeline (Moranbah to Townsville). This pipeline does not currently have sufficient capacity to supply a new generator in Townsville.

- While there are substantial reserves of gas in Moranbah, there are currently no bankable reserves to supply a new Townsville generator.

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99 ROAM Consulting was involved in developing the probabilistic model used by Powerlink. In particular, it provided advice to Powerlink on the likelihood of generation developments in Queensland over the next regulatory period.

100 Oil Search Limited, *PNG gas commercialisation update*, 1 February 2007.

- The proposed development of the Moranbah to Gladstone pipeline will link the North Queensland gas pipeline to gas reserves in the south of Queensland, which potentially could result in Townsville sourcing its gas from South Queensland.[101]

AGL is the proponent of the Townsville generator and a 50 per cent stakeholder in the MGP. The AER sought advice from AGL on its intentions to develop a generator in the next regulatory period in Townsville. AGL confirmed that it is developing its plans for a 380 MW gas fired power plant at Townsville and that it may be operational around a similar timeframe as if the PNG gas pipeline had proceeded. However, it acknowledged that at present the Moranbah gas field does not have sufficient proven reserves to support the generation project. AGL also advised that the Moranbah to Gladstone pipeline would compete for gas reserves that could be transported northwards.

The AER also examined advice provided by ROAM on this issue. ROAM stated that the capacity of the current reserves is not sufficient to fuel the Townsville generator.[102] While there is a large reserve of 3P gas—some of which may be converted to 2P following further exploration—in Moranbah, ROAM was unable to assess the likely magnitude of any recertification.[103] It indicated that 2P reserves would not be developed unless there is high demand for electricity throughout the state. It therefore believed that the Townsville generator would only proceed under high-growth scenarios.

ROAM considered that no gas field other than Moranbah can supply the Townsville region until such time that the North Queensland Gas Pipeline is extended from Gladstone to Moranbah, providing Townsville with access to gas from south of the state. ROAM advised that it did not consider that the development of this pipeline would present a reliable source of gas into Townsville in the next regulatory period.

The AER has examined both the information provided by AGL and ROAM. It considers that further exploration of the Moranbah gas fields is required before establishing whether the gas reserves would be sufficient to supply a generator in Townsville. Further, the AER notes that there is uncertainty over whether the Moranbah to Gladstone pipeline will improve the availability of gas to Townsville from the south of Queensland. Given the current uncertainty, the AER accepts the view of Powerlink and ROAM that the likelihood of the Townsville generator should only be included for high-growth scenarios.

Appropriateness of the review undertaken by Powerlink

Powerlink re-evaluated its forecast capex based on a zero probability of generation associated with the PNG gas pipeline. As part of this re-evaluation, Powerlink did not propose any new transmission or generation projects, and maintained the timing of all

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101 Enertrade is proposing to build, own and operate approximately 440 kilometres of high pressure gas transmission pipeline from Moranbah to Gladstone. This would effectively link Gladstone to the North Queensland gas pipeline.

102 According to ROAM, as of December 2005, the Moranbah Gas Project has 382 PJ of P2 reserves (probable reserves), of which 290 PJ were dedicated to Enertrade under its gas supply arrangement leaving an available balance of 92 PJ. The Townsville generator would require 20 PJ per annum for 20 years. Based on this calculation ROAM estimates that the generator could be supplied for fewer than five years.

103 According to ROAM there is 1500 PJ of 3P fuel in the Moranbah region. 3P is defined as possible reserves of gas as opposed to 2P reserves, which are probable.

original projects. Instead, Powerlink revised the top down weightings of its probabilistic model to adjust the probability of generation from PNG gas from 50 per cent to zero per cent.[104] That is, the value of projects within the probabilistic model has been affected only by the change in the theme set probability.

The AER assessed whether the outcomes of Powerlink's review were reasonable and whether Powerlink had adopted a consistent methodology with its original capex proposal.

Powerlink undertook the following steps in updating the probabilities of scenarios to take into account the zero probability of generation from the PNG gas pipeline:

- determining a new top down weighting for each scenario to include a weighting of zero per cent for the PNG theme[105]
- simulating the application of the moderation process undertaken by ROAM[106]
- scaling the probability of each scenario down to ensure the summated probabilities equated to100 per cent [107]
- adjusting the scaled probabilities to reflect the same proportions as the original application for the summated low, medium and high-growth scenarios.

To quantify the impact of the revised probability of the PNG gas theme, the deterministic capex was multiplied by the updated probabilities to arrive at a weighted capex. The increase in the forecast total capex for the next regulatory period due to the revised probability was found to be $57 million.

PB found that the revised outcomes of the approach generally reflected an efficient approach to network development. In reaching its conclusion, PB assessed the Strathmore to Ross project and found that the increased probability for this project was reasonable.

The AER considers that Powerlink's approach would generally result in reasonable outcomes. The AER accepted it was reasonable for Powerlink to include generation from the Townsville generator only under high-growth scenarios, which would increase the transmission needs between CQ and NQ under the medium-growth scenarios, as demonstrated by the increased probability of the Strathmore to Ross project.

An important outcome of Powerlink's review was to increase the probability of gas generation developments, based on coal seam methane (CSM) in South West Queensland (SWQ). The AER considers this may be a likely outcome if PNG does not

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104 Powerlink has effectively reduced the number of scenarios from 40 to 20.

105 Top down weighting are the original weightings given to each theme set. For instance, the low load growth theme had a 20 per cent top down weighted probability.

106 In the original proposal, ROAM moderated the probability of scenarios to take into account the probability of generation projects included within each scenario.

107 Following the moderation process, the summation of probabilities for the remaining 20 scenarios was 107.8 per cent. Powerlink scaled each scenario's probability down by 7.08 per cent.

proceed in the next regulatory period. This would reduce the transmission needs between CQ and SQ as more generation can be dispatched from South West Queensland into South East Queensland (SEQ).

While noting that the revised outcomes were generally reasonable, the AER also required PB to assess whether the methodology behind Powerlink's additional capex proposal of $57 million was consistent with the approach taken to develop the original capex proposal. PB noted that Powerlink had not undertaken the detailed moderation process used in the original capex proposal but had sought to apply the probabilities used in the original moderation process.[108] PB accepted that the adopted approach was pragmatic given the time constraints and was a good approximation of the more detailed moderating approach.

The AER notes that Powerlink's review would have been consistent with its original capex proposal had it sought to undertake a re-assessment of the moderation process. This would have involved a review of the probabilities of generation projects to determine the moderated probabilities for the remaining 20 scenarios. Powerlink did not undertake this process and instead sought to replicate the adjustments of the original moderation process. However, the AER considers it was reasonable for Powerlink to replicate the moderated probabilities of the model given the time constraints in undertaking the moderation process.

PB considered that the only questionable aspect of Powerlink's approach was the final adjustment Powerlink applied to calculate the revised moderated probabilities. Powerlink indicated it had adjusted the final probabilities to maintain the same ratio of probabilities for the low, medium and high-growth theme sets in the original capex proposal. PB indicated that the consequence of the final adjustment was to reduce the probability of the low economic growth theme and to increase the probabilities of the medium and high-growth themes. It considered it was unnecessary for Powerlink to undertake this final adjustment of probabilities. PB advised that the removal of the final adjustment would reduce the additional capex sought by $10 million.

The AER notes that when reviewing the impact of zero per cent probability of generation from PNG gas, Powerlink followed a consistent methodology with its original capex proposal. It applied the revised top down theme weightings to arrive at the original scenario probabilities and applied the outcomes of the original moderation process to arrive at the moderated probabilities of the original capex proposal. In following this process, Powerlink found that the summated probabilities were reduced for the high and medium economic growth themes and were increased for the low economic growth theme. Powerlink introduced a final step in the review process by adjusting the final probabilities to reflect the summated probability outcomes of the original capex proposal. Powerlink argued that it introduced this last step to ensure that

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[108] ROAM allocated the most likely generation projects to each scenario with regard to maintaining current generation reserves and based on the market characteristics of the scenario. ROAM also determined the bottom up probability of generation developments in the next regulatory period. As part of the moderation process, ROAM re-assessed the top down weightings of each scenario to take account of the bottom up probability of generation developments. As such, the moderation process is an attempt to capture the influence of the probability of generation developments in allocating probabilities to scenarios. The bottom up probabilities have changed due to the zero likelihood of generation from PNG. Powerlink has not re-evaluated the moderation process but has replicated the original moderation process outcomes.

the review did not affect projects solely driven by demand growth and unaffected by generation developments.

The AER agrees with PB that this final adjustment compromises the outcomes of the Powerlink review because it is inconsistent with the methodology used in the original capex proposal. The AER notes that the original moderation process was not designed to arrive at specific load growth theme probabilities rather, this was an outcome of the moderation process. In this regard, the AER notes that the initial moderation process also had an effect on the probability of projects solely driven by demand growth and that at the time of the original capex proposal Powerlink had not sought to include a final adjustment to address this outcome.

As a result, the AER accepts the PB recommendation to maintain the integrity of the probabilistic model by removing the final adjustment factor. Following a request from the AER, Powerlink advised that this adjustment would result in a reduction of $13 million to Powerlink's capex.

Conclusion

Overall, the AER's conclusion is that:

- it is reasonable for Powerlink to assume that there will be no additional generation from gas in the Townsville area during the next regulatory period, except under high-growth scenarios

- Powerlink's review process was generally reasonable given the time restrictions involved, however, the final adjustment to scenario probabilities process was inconsistent with the methodology used to develop the original capex proposal.

The AER therefore accepts PB's recommendation to reduce Powerlink's proposed capex increase by $13 million. Accordingly, the AER's conclusion results in an additional $44 million to capex due to the impact of revised probability of generation from the PNG gas pipeline (table 4.10).

Table 4.10 AER's conclusion on additional capex due to impact of revised probability of generation from PNG gas pipeline ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	–0.25	2.60	36.17	18.39	–0.13	56.78
AER's adjustment	–2.88	–2.83	–3.17	–2.84	–1.21	–12.92
AER's conclusion	–3.13	–0.23	33.00	15.55	–1.34	43.86

4.4 2006 demand forecast

4.4.1 Powerlink's proposal

Powerlink's original capex proposal of April 2006 was based on demand forecasts contained in its 2005 *Annual Planning Report* (APR). In June 2006, Powerlink published its 2006 APR, which indicated that peak demand forecasts had increased since the release of the previous year's APR. As part of its supplementary proposal,

Powerlink considered that its capex for the next regulatory period should be reviewed taking into account these revised demand forecasts.

Using its 2006 demand forecasts, Powerlink revised the transmission development plan for each of the 40 scenarios in its probabilistic model and developed a revised probability weighted capex. Powerlink considered that the net impact of the increased demand was about a one-year advance in demand levels and a consequential need to advance some network augmentations. Powerlink determined that the revised demand forecasts resulted in an increase in capex requirements of $129 million. Table 4.11 shows the annual expenditure profile of this increase. The Powerlink review assumed that the capex had already been adjusted for the CQ–SQ revision, higher input costs and the revised probability of the PNG gas pipeline theme.

Table 4.11 Powerlink's additional capex requirement due to higher demand ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	55.12	54.42	–57.27	50.33	26.40	129.00

4.4.2 PB's review

The AER engaged PB to assess whether the increase in Powerlink's proposed forecast capex allowance due to higher 2006 demand forecasts was efficient. PB was required to identify the projects Powerlink proposed be brought forward, to determine whether their advancement was appropriate and to assess whether any other projects should be advanced or deferred. It was required that the PB assessment be informed by a detailed review of three projects that were advanced in timing. PB was not required to review the accuracy or reasonableness of Powerlink's revised demand forecasts.

PB found that:

- Powerlink had adopted a rigorous and systematic review that involved the reassessment of the 40 transmission development plans for five critical geographic load zones in its network.
- Powerlink's review was fundamentally consistent with the approach used to develop its original revenue cap application but, due to time constraints, was restricted to the consideration of thermal limitations.
- Given the size of the increases in the peak summer demand forecasts, the timing of the transmission development plans had to be advanced.
- Based on its detailed review of three projects, Powerlink's proposed additional capex should be reduced by $39 million, largely because of the finding that one of the reviewed projects (Halys to Blackwall) should not be advanced to the extent proposed by Powerlink. However, PB agreed with the advancement of the other two projects it reviewed.

- Powerlink had identified that its proposed capex increase should be reduced by $5.6 million due to the inaccurate application of the revised demand forecast in the SQ high economic growth 10 per cent probability of exceedance (PoE) scenario.

- Powerlink should provide further assurances to the AER regarding its ability to deliver the revised program of works.

Overall, PB recommended that $84 million in additional capex associated with the higher demand forecasts be included in Powerlink's capex allowance. Table 4.12 shows the adjustments recommended by PB.

Table 4.12 PB's recommendation on additional capex due to higher demand forecasts ($m, 2006–07)[1]

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	55.12	54.42	–57.27	50.33	26.4	129.00
Halys to Blackwall project	–	–	–6.10	–60.50	27.30	–39.30
SQ high growth rate	–	–	–	–2.78	–2.78	–5.56
PB's total adjustment	–	–	–6.10	–63.28	24.52	–44.86
PB's recommendation	55.12	54.42	–63.37	–12.95	50.92	84.14

[1] PB's adjustments were based on median timings and therefore differ from Powerlink's cost accumulation model.
Note: Total may not add due to rounding.

4.4.3 AER's considerations

Appropriateness of the revised demand forecasts

PB was not required to review the reasonableness or validity of Powerlink's revised demand forecasts. However, PB assumed that it could rely on the updated demand forecasts when it reviewed the process and outcomes of the Powerlink review.

Powerlink stated that the higher demand forecasts are attributable to a number of factors including:

- record levels of new air conditioners and upgrades of existing units in SEQ. The 2005 rate of installations exceeded the 2004 rate with a consequent increase in the demand and temperature sensitivity of the load[109]

- increased population growth rates in SEQ between 2002 and 2004 (2.5 per cent to 3 per cent per annum), which has raised the level of underlying population growth expected for the next ten years

- National Institute of Economic and Industrial Research (NIEIR) predictions of economic growth rates in Queensland have slightly increased over the next ten years

[109] Powerlink indicated that since the 2005 load forecast, load sensitivity in SEQ has increased from 118 MW per C° to 170 MW per C°.

- changed forecast loads at existing and new coal mines in CQ
- development of new (Gladstone) and expanded (Dalrymple) coal handling facilities before 2010
- expected small increases in output at some existing major industrial loads (e.g. Gladstone and Townsville)
- current observed levels of development proposals and construction activity in SEQ remain higher than historical levels.

There has been a significant increase in demand forecasts between the 2005 and 2006 APRs. Table 2.13 shows the change in demand forecasts for each zone in Powerlink's network for medium demand growth between 2005 and 2006 based on 10 per cent PoE weather conditions.

Table 4.13 Changes in the Queensland (coincident[1]) peak summer demand for medium growth 10 per cent PoE conditions between 2005 and 2006 APRs (MW)

	2007–08	2008—09	2009–10	2010–11	2011–12
Far North	9	9	10	11	12
Ross	–88	–88	–90	–92	–94
North	45	48	69	67	69
Central West	84	94	102	105	109
Gladstone	–63	–65	–54	–42	–43
Wide Bay	–9	–9	–9	–10	–11
South West	6	5	2	1	–2
Moreton North	86	72	79	75	74
Moreton South	149	172	133	118	124
Gold Coast[2]	36	45	38	40	48
Total	255	283	280	273	287

[1] The coincident demand is the expected load for the zone at the time of the state peak. Powerlink noted that the area peak would often be higher than at the time of the state peak and that this needs to be considered when planning its network.

[2] Gold Coast also includes the Tweed region which is not included in the 2006 APR as it is defined as part of New South Wales. However, Powerlink supply the load in the area due to a connection agreement.

A review of the data in table 4.13 indicates that:

- There has been a net increase in demand forecasts between the 2005 and 2006 forecasts for each year of the next regulatory period. For instance in 2007–08, there has been a 2.9 per cent increase.[110]

[110] Based on table 4.5 of the PB report. The 2007–08 coincident load forecasts for 10 per cent PoE medium growth under the 2005 forecasts is 8936 MW. Under the 2006 forecasts, it is 9191 MW.

- There has been a shift in the underlying base of the demand forecasts for the medium growth scenarios for 10 per cent PoE weather conditions.[111] The shift in demand forecasts is equivalent to a one year advancement of forecasts in SEQ

- The most significant increase in demand forecasts is in SEQ (i.e. Moreton North, Moreton South and the Gold Coast zones).[112] There have also been material increases in demand forecasts for NQ and CQ. Ross and Gladstone experienced material reductions in load forecasts.

- Overall, the increase in demand forecasts was significantly higher for 10 per cent PoE weather conditions than the 50 per cent PoE forecasts. These were driven primarily by the higher forecasts in SEQ because of increased temperature sensitivity.

The AER considers that the change in demand forecasts between 2005 and 2006 is consistent with the reasons put forward by Powerlink. These reasons for increases in demand forecasts for SEQ, NQ and CQ include higher than expected economic growth rates, increased underlying population growth rates and increased sensitivity of load to ambient temperatures.

The AER notes that the increasing sensitivity of load to ambient temperatures due to air conditioning installations is a key explanation for higher demand forecasts in SEQ. The AER has reviewed additional information provided by Powerlink that demonstrates there has been a marked increase in the sensitivity of load in SEQ between the 2004–05 summer and the 2005–06 summer. The AER considers other factors, such as higher population rates and increased development activity, have also contributed to the increase in demand forecasts in SEQ.

The AER has reviewed Powerlink's provided information about its 2006 demand forecasts and considers that its reasons for the increase in demand forecasts are reasonable. The AER also notes that Powerlink's methodology for forecasting the 2006 demand is consistent with the approach used in its 2005 demand forecasts. In the draft decision, the AER concluded that Powerlink had used an appropriate methodology for determining its 2005 demand forecasts. It therefore considers that a further review of the revised demand forecast is not required. The AER also notes that interested parties did not raise any concerns regarding Powerlink's demand forecasting methodology or its outcomes.

Appropriateness of the review undertaken by Powerlink

Powerlink reviewed the impact of the higher demand forecasts on the timing of critical projects for all 40 scenarios in its probabilistic model. The review identified 28 projects where a change in the original proposal's timing was considered necessary. Table 4.11 of PB's report lists these projects, along with an estimate of the increased capex requirements based on median timings.

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111 For example, the 2006 demand forecast for 2007–08 under medium 10 per cent PoE weather conditions is 255 MW higher than the 2005 forecasts. The difference only rises to 287 MW by 2011–12.

112 The increase in the coincident peak summer demand for SEQ in 2007–08 is 271 MW under 10 per cent PoE medium growth scenarios. This compares with 84 MW in Central West and 45 MW for North Queensland.

Nine of these projects are in SEQ, two projects are associated with supply from CQ to NQ, another nine are associated with supply to SQ and eight are associated with 275/110 kV transmission capacity in SEQ. As noted in table 4.13, the major increases in demand forecasts were in SEQ, Central West Queensland and NQ. As such, the projects identified by Powerlink as requiring advancement align broadly with areas where higher demands are forecast.

The key features of Powerlink's assessment are that it:

- is limited to a review of the impact on the main grid interconnections:
  - SWQ to SEQ (peak demand levels advanced by one year relative to 2005 forecasts)
  - CQ to NQ (peak demand levels advanced by one to two years relative to 2005 forecasts)
  - CQ to SQ (peak demand levels advanced by one year relative to 2005 forecasts)[113]
- only assesses the change in the 10 per cent PoE demand forecasts between 2005 and 2006, as the review is limited to the backbone of Powerlink's network
- is limited to assessing thermal constraints and does not seek to revise the timing of projects based on voltage stability or voltage control limitations
- does not review projects associated with joint planning and connections, as Powerlink considered there would not be a material impact on these projects
- undertakes a full review of the NPV analysis of alternatives considered to resolve network constraints
- does not make any changes to the scope of projects as a result of the higher load forecast.

The AER considers that the methodology used in, and the outcomes of, the Powerlink review should be assessed to determine whether Powerlink adopted a reasonable approach in determining the impact on its capex requirements due to the higher demand forecast. In this regard, the AER makes the following observations:

- Powerlink did not undertake a complete review of its network. It limited its approach to examining the impact of the higher forecast demand on the major flow paths (i.e. the backbone of its network). The AER considers that it was reasonable for Powerlink to limit its review to the major flow paths of its network given the significant change in 10 per cent PoE forecasts.

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[113] Powerlink also advised that it reviewed the far North Queensland and Gold Coast grid sections in detail. However, it was the SWQ to SEQ, CQ to NQ and CQ to SQ reviews that resulted in the majority of project timing adjustments.

- Powerlink has not reassessed the timing of its joint planning projects and connections as part of its review. This appears reasonable as these projects are based on 50 per cent PoE forecasts, which have not increased to the same extent as the 10 per cent PoE forecasts.

- Powerlink has based its review of additional capex requirements associated with higher demand forecasts on thermal limitations only. PB considered this a pragmatic approach given the time limitations.

- As part of its review, Powerlink deferred or removed projects from individual scenarios if they were no longer required due to the advancement of another project in the scenario.

The AER has reviewed PB's analysis of Powerlink's approach to reassessing its capex requirements because of higher demand forecasts. The AER accepts PB's finding that, given the size of the increase in peak summer demand forecasts, it is reasonable for Powerlink to review its transmission development plans and that this review has been undertaken in a systematic and rigorous basis. The AER, therefore, considers that Powerlink's approach to reviewing its capex requirements was reasonable.

Findings from PB's detailed review of three projects

Under its terms of reference, PB reviewed three of the 28 projects affected by higher demand forecast to determine whether the change in timing was appropriate.[114] The projects selected by PB were the:

- Stanwell to Broadsound second 275 kV circuit (CP.01156/B)

- establishment of Halys 275kV substation and the Calvale to Halys 2nd double circuit line—single circuit strung (CP.00369/A)

- Halys to Blackwall 500 kV double circuit operating at 275 kV (CP.01875).

PB considered that it was reasonable for the Stanwell to Broadsound 275 kV line project and the Halys 275 kV substation and Calvale to Halys line project to be brought forward. The AER has reviewed the information provided by Powerlink on these projects and PB's analysis of that information. Consistent with its consultant's expert advice, the AER accepts there is a need for Powerlink to advance the timing of these projects to maintain its reliability obligations.

In relation to the Halys to Blackwall project (CP.01875), PB did not agree with Powerlink's view that the project should be advanced by three years in some scenarios. PB reviewed information provided by Powerlink on the advancement of the project for four critical scenarios. Based on a review of the thermal overloads, PB recommended that for two of the four scenarios, the project should be advanced to 2013–14 rather than 2011–12 as proposed by Powerlink. PB stated that, since the thermal overload is

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[114] The AER considered it was sufficient for PB to review three projects, given the time constraints involved in reviewing the supplementary proposal. PB selected the three projects based on their materiality.

marginal in 2011–12, the timing of the project could be deferred until 2013–14 through a number of lower cost short-term measures.

PB also reviewed additional information provided by Powerlink on the voltage constraints into SEQ. It found that the voltage constraints were substantially higher than the thermal overload in 2011–12 and 2012–13. PB considered that the installation of the South Pine static var compensator (SVC) in 2011–12, consistent with the timing in Powerlink's original revenue cap application, would alleviate the voltage constraints until 2013–14. Based on these considerations, PB recommended a reduction of $35 million from Powerlink's proposal based on the two critical scenarios and a further $4 million reduction for the possible application of inefficient timing of the project in the other scenarios, which it did not examine.[115]

Consistent with its approach in the draft decision, the AER sought advice from CHC on the advancement of this project. Based on its review, CHC advised that certain mitigation strategies recommended by PB to address the thermal constraint appeared reasonable, and should be part of any later detailed analysis. Further, CHC considered it was reasonable to assume that the installation of the SVC could address the voltage constraint.

Consistent with its consultants' advice, the AER accepts that, for two critical scenarios, the project should only be advanced to 2013–14 rather than to 2011–12 and that addressing the emerging voltage constaints will require the installation of an SVC in 2011–12. The AER, however, has decided not to accept PB's reduction of $4 million to account for possible inefficient timing in the other scenarios for this project because PB has not provided any evidence to suggest that the project in the other scenarios is inefficiently timed.[116]

SEQ high growth review

During its review, PB questioned Powerlink on why the SQ high-growth 10 per cent PoE trace had inconsistent characteristics relative to the respective low and medium traces. Powerlink advised PB that the treatment of the SQ high-growth 10 per cent PoE demand increases between 2005 and 2006 had not been incorporated accurately into Powerlink's planning processes.

Powerlink subsequently updated its transmission development plans and advised that the overall impact of the correction was to reduce the proposed increase in capex by $5.6 million. PB accepted the reduction but acknowledged that it had not had the opportunity to review the adjustment. The AER accepts the reduction of $5.6 million to Powerlink's proposed additional capex.

Conclusion

The AER has reviewed Powerlink's claim that its total forecast capex should be increased by $129 million because of the advancement of network augmentations

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115 Based on Powerlink's review, the project had been advanced in five scenarios and introduced into eight scenarios. PB investigated four of the scenarios it considered critical.

116 Out of the four scenarios that PB examined, it found that the project should be advanced in timing for two of these scenarios.

resulting from higher demand forecasts. The AER agrees with PB's recommendation that Powerlink's proposed increase in capex for higher demand forecasts should be reduced for the inefficient advancement of the Halys to Blackwall project in two critical scenarios but that an allowance should be made for the inclusion of an SVC in these scenarios. However, the AER does not agree that Powerlink's proposed capex should be reduced to reflect the possible inefficient timing of the project in the scenarios it did not examine.

The AER accepts Powerlink's advice that there should be a reduction of $5.6 million in its proposed capex increase to allow for the incorrect application of the SQ high-growth PoE demand increases.

Following an AER request, Powerlink advised that the AER's conclusion would result in a reduction of around $55 million from Powerlink's proposed increase. Consequently, the AER has allowed an additional $74 million for Powerlink's capex due to the impact of higher demand forecasts, as shown in table 4.14.

Table 4.14 AER's conclusion on additional capex due to higher demand forecasts ($m, 2006–07)

	2007–08	2008–-09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	55.12	54.42	–57.27	50.33	26.40	129.00
AER's adjustment[1]	–7.94	2.53	3.45	–53.96	0.90	–55.02
AER's conclusion	47.18	56.95	–53.82	–3.63	27.30	73.98

[1] PB estimated that its recommendation to advance the Halys to Blackwall project by one year to 2013–14 and to install an SVC in 2011–12 would reduce Powerlink's additional capex due to higher demand forecasts by around $35 million. The AER's adjustment is based on Powerlink's modelling of PB's recommendation.

4.5 High speed monitoring project

4.5.1 Powerlink's proposal

Powerlink has proposed that an additional $2.35 million ($2006–07) be included in its capex allowance to install high speed monitoring (HSM) facilities. It indicated that NEMMCO requires these facilities to allow it to discharge its market and power system security functions. Powerlink stated that the HSM project was not included in its original revenue cap application because at the time it was not aware of the specific details of NEMMCO's requirements. Powerlink also stated that it and NEMMCO had jointly investigated the suitability of Powerlink's existing monitoring systems, but had found them unsuitable.

4.5.2 AER's considerations

NEMMCO's HSM project involves communication of high speed demand data from monitors at key locations in the NEM. The project aims to enhance power system security by providing timely access to greater amounts of demand data than currently available.

The AER sought further information from NEMMCO on the HSM project, including:

- the required timeframe for installation of the monitoring equipment
- when Powerlink was made aware of the details of the HSM project
- the suitability of Powerlink's existing monitoring equipment
- the efficiency of the cost proposed for the project
- whether other TNSPs in the NEM have been required to implement NEMMCO's HSM requirements.

NEMMCO noted that it sought agreement to proceed with the project from all TNSPs in November 2006. It also confirmed that Powerlink's existing monitors were unsuitable and that Powerlink would need to install new monitors around its network. NEMMCO also stated that it had reviewed the scope of works that Powerlink was proposing for the project and had confirmed that this will meet the functional specification developed by NEMMCO's HSM Technical Working Group. However, NEMMCO was unable to comment on whether the proposed cost of the project was efficient.

The AER also requested Powerlink to provide additional information on the options it had considered to meet NEMMCO's requirement and whether the cost of the project was efficient. Powerlink indicated that it had assessed the options of using or extending the capability of its existing systems to meet NEMMCO's requirements and/or combining Powerlink's requirements with NEMMCO's requirements. Powerlink concluded that its monitoring systems currently used for planning purposes did not meet NEMMCO's requirements, as they do not have the necessary functionality or performance capability. Powerlink also stated that it had consulted with other TNSPs to identify all known solutions and that this investigation had found that there is currently only one known credible solution to meet the needs of NEMMCO. Powerlink stated that it had applied its standard estimating process to develop a cost estimate of the project based on this solution and considered the project cost of $2.35 million to be efficient.

Based on the additional information provided by NEMMCO and Powerlink, the AER considers that the project, with a cost of $2.35 million, to be efficient and therefore should be included in Powerlink's forecast capex allowance.

4.6 Consequential adjustment on opex

4.6.1 Powerlink's proposal

Powerlink has requested consequential adjustments be made to its controllable opex as a result of the changes in the value and timing of assets being constructed and coming into service (i.e. being capitalised). The AER accepts that consequential adjustments to Powerlink's opex need to be made for the revised capitalisation of assets (excluding finance during construction) because of changes made to Powerlink's forecast capex allowance. The AER's consideration of the revised capitalisation and its impact on opex is set out in section 6.9 of this decision.

4.7 Pass through of changes to payments for easements

4.7.1 AER's draft decision

Clause 11.6.12(j)(3) of the Powerlink transitional provisions states that for the duration of the next regulatory period the relevant new chapter 6A rules apply to any positive or negative pass through event, with any necessary modifications to apply to the relevant provisions to this decision. Clause 6A.7.3 of the new rules outlines the criteria for cost pass through. In the draft decision, the AER adopted the cost pass through mechanism set out in the new rules, without modification, for the following six change events:

- an easement tax change event
- an insurance event
- a regulatory change event
- a service standard event
- a tax change event
- a terrorism event.

4.7.2 Powerlink's proposal

Powerlink stated that in recent times some property owners affected by proposed new transmission lines have lobbied the Queensland Government for changes or additions to compensation arrangements for easements. Existing provisions provide for a single upfront payment to the landholder in exchange for an easement in perpetuity. Powerlink stated that those lobbying for a change are seeking an annual payment that may result in payments with a higher net present value than the existing one-off payment.

Powerlink claimed that this is conceptually similar to 'tax change' events for which pass through arrangements are already available in the new rules. It is seeking a pass through event to cover such a change should it arise during the next regulatory period.

4.7.3 AER's considerations

The AER has maintained the position it took in the draft decision. It considers that there is no need to modify the arrangements in the new chapter 6A rules to allow for a pass through event regarding changes to payments for easements during the next regulatory period. Subject to meeting the materiality threshold and the criteria set out in the new rules, the situation described by Powerlink would appear to satisfy the definition of a regulatory change event and would permit Powerlink to seek a pass through amount for additional easement compensation costs.[117] In accordance with the new rules, the AER will assess such pass through application and then make a determination on it.

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[117] A regulatory change event is defined as a change in a regulatory obligation that substantially affects the manner in which a TNSP provides prescribed transmission services and results in the provider incurring materially higher or materially lower costs when providing those services, than it would have incurred but for that event.

4.8 Contingent projects

In its supplementary proposal, Powerlink sought a contingent project for the possibility of additional desalination plants and one relating to a material variation to the timing of generation planting in SEQ. These proposals are considered in section 3.9.

4.9 Deliverability of forecast capex program

4.9.1 AER's draft decision

In the draft decision, the AER indicated that an assessment of Powerlink's ability to deliver its forecast capex program was necessary because under the capex incentive framework a TNSP is able to retain, within the regulatory period, the excess return on and of capital associated with a lower expenditure than the approved capex allowance. The AER, in light of this review, considered that Powerlink had the potential to deliver the forecast capex program. It noted that:

- Powerlink was on track to deliver more than $500 million in capex for 2006–07
- Powerlink had undertaken a number of initiatives to deliver the increased capex for the next regulatory period
- Powerlink had increased staff numbers and established long-term contractual arrangements with construction contractors
- the significant increase in capex from the current period appeared to result from cost increases rather than work effort.

4.9.2 Issues raised in submissions

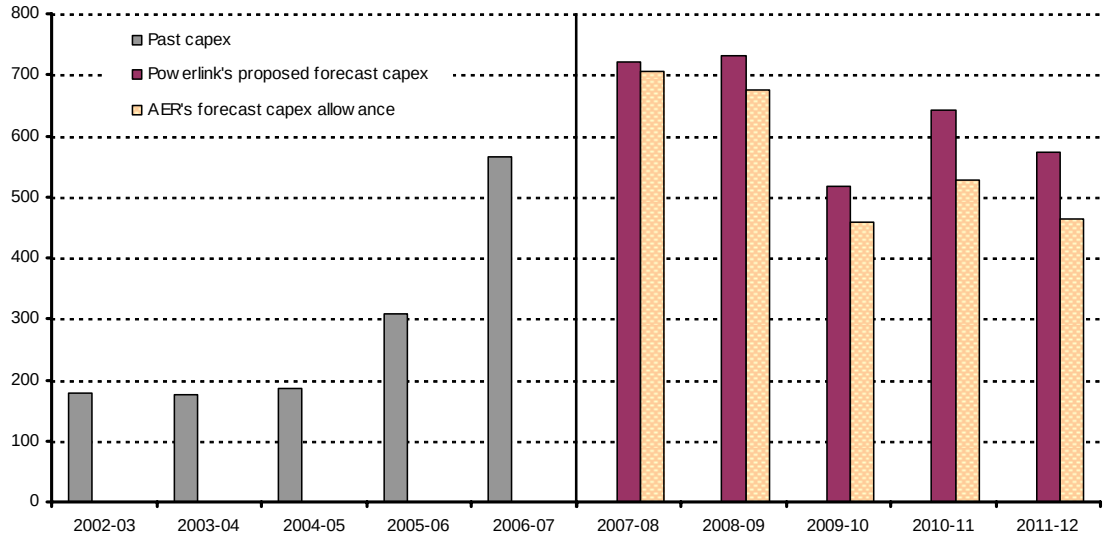
Powerlink noted that its revised proposal represents an annual average expenditure that is not materially different from what is already being delivered in 2006–07 ($567 million). Powerlink further noted that the dollar increase in capex is largely associated with increases in input costs and includes several major transmission line projects with relatively large dollar values. Powerlink stated that it is confident it can deliver the capex program, with the proviso that it can meet the Queensland market rates for construction and labour.

The EUAA was concerned about the deliverability of Powerlink's capex program. It stated that the capex program would be difficult to deliver due to the inability to source sufficient contractors to undertake the work.

4.9.3 AER's considerations

The AER notes that the forecast capex allowance in this final decision is materially higher than the draft decision. The amended capex profile for the first two years of the regulatory period is on average around $691 million ($nominal) per annum but then reduces in the final three years to around $483 million per annum. Figure 4.4 shows the annual profile of capex incurred by Powerlink during the current regulatory period. It also compares Powerlink's annual forecast capex proposal with the AER's annual forecast capex allowance

Figure 4.4 Comparison of actual past capex and forecast capex ($m, nominal)



Source: Past capex figures (as-incurred) provided by Powerlink.

The AER has reviewed the amended capex profile that resulted from its conclusions on Powerlink's forecast capex and considers that there are some risks associated with Powerlink's ability to deliver the amended capex profile in the first two years of the next regulatory period. These levels of capex are materially higher than the amount of capex undertaken by Powerlink in 2006–07.

Given these risks, the AER requested Powerlink to provide further information regarding its ability to deliver higher levels of capex in the next regulatory period. Powerlink responded that:

- It has a demonstrated track record in increasing its capacity to deliver capex—for instance, it has increased its capex from less than $200 million in 2004–05 to more than $500 million in the current financial year.

- The increase in capex requirements between its original revenue cap application and the supplementary proposal are mostly driven by increases in input costs rather than additional physical work. Powerlink indicated that in 2007–08 and 2008–09, more than half the increase in capex was associated with input cost increases and less than half was associated with additional physical work.

- It has flexible contracting and construction arrangements in place for transmission line and substation works and that the cumulative capability of these arrangements is higher than the estimated physical work requirements (including the works in its supplementary submission). Powerlink stated that these arrangements can be ramped up or scaled back depending on its actual requirements and will facilitate the delivery of the revised capex program.

- Its supplementary proposal included several major transmission line projects with relatively large dollar value. Powerlink considered that a program dominated by large projects is more deliverable than an equivalent dollar value portfolio of smaller projects because larger projects have a lower requirement for highly skilled workers

and a higher requirement for materials, and result in economies of scale in project supervision.

- Its contracting arrangements and the long-term program of works are conducive to the contractor recruiting and training new employees in electrical design and construction. Powerlink considered that the sustainable long-term workload encourages contractors to invest in specialised equipment for project delivery.

In the draft decision, the AER noted that Powerlink had implemented a number of initiatives that would assist in delivering the amended capex program. The AER requested Powerlink to provide an update on these initiatives and to indicate whether it had implemented any new initiatives since the draft decision. Powerlink responded that its delivery initiatives continue to provide further gains and additional capacity for delivery of its capital investment program. It also considered that the full benefits of the implementation of these initiatives would be evident in 2007–08 and beyond. Powerlink also identified areas of ongoing focus and some new initiatives including the following:

- Powerlink has identified commissioning resources as a key factor in the delivery of its capex program due to the high skills required and limited transferability or substitutability of these skills. It has introduced initiatives to address this issue including staggering commissioning dates for projects, minimising the amount of testing required during commissioning such as maximising off site testing, and outsourcing some of this work.

- Powerlink has divided its capex program into seven programs of work and implemented internal structures for program management to facilitate better coordination of projects within the programs to achieve smoother resource requirements. It stated that the benefit of smoothing resources is to retain resources to work through a continuous program of projects rather than starting from scratch with new contracts for each individual project.

- Powerlink has streamlined the planning and approval of projects. The purpose of this initiative is to improve lead times for projects to facilitate better resource coordination and minimise the risk of bottlenecks for critical activities. It noted that the development of grid plans for its revenue cap application involved more comprehensive planning analysis than normally undertaken and therefore provides a better basis for ongoing planning and approval work, and contributes to an ability to increase lead times for projects.

Overall, Powerlink indicated that it was confident that it could deliver its forecast capex program of work.

While acknowledging that the amended capex program is challenging, primarily in the first two years of the next regulatory period, the AER still considers that overall Powerlink has the potential to deliver the AER's amended forecast capex allowance for the following reasons:

- Powerlink has undertaken a number of initiatives to improve its capacity to deliver its capex program. These initiatives appear to be effective in allowing Powerlink to be able to deliver a significantly higher level of capex. The AER notes that

Powerlink has increased its capex spending by 85 per cent from $307 million in 2005–06 to $567 million in 2006–07. In addition, Powerlink has further implemented new initiatives that should improve its capacity to deliver a materially higher level of capex in the first two years of the amended capex program such as improved internal project management structures and more effective use of commissioning resources.

- A key driver of the increase in the amended capex program, relative to the draft decision capex allowance, is higher input costs. The AER's analysis indicates that 54 per cent of the increase in the amended capex program for 2007–08 and 40 per cent of the increase for 2008–09 is due to higher input costs. To the extent that higher input costs are a reason for the increased capex, the AER notes that it does not affect the level of physical work that Powerlink would need to undertake over those years.

- In response to the EUAA's concerns on Powerlink's ability to source sufficient contractors to undertake the work, Powerlink provided the AER with information on the contractors it has engaged to construct transmission lines, substations and secondary systems. It advised that it engages all of Australia's transmission line contractors and engages three substation contractors.[118] Powerlink stated that the cumulative capacity of its contracting arrangements is in excess of the physical works required. Based on the information provided by Powerlink regarding its contractors and flexible contracting arrangements, the AER considers that Powerlink appears to have sufficient contracting resources in place to deliver the amended capex program.

- The AER sought assurance from Powerlink on whether it was on track to deliver ten projects with target commissioning dates in 2007–08. Powerlink responded that with the exception of the Oakey substation project, the projects have the same target commissioning dates as identified in its revenue cap application. In regards to the Oakey substation, Powerlink advised that the delay in timing was not due to deliverability issues.[119]

- The AER has allowed higher labour escalators than in the draft decision and adjustments to two S-curves. The AER considers that the revised labour escalators will allow Powerlink and its contractors to attract and retain the labour necessary to deliver the amended capex program. Further, the AER's adjustments to line and substation S-curves should ensure the timely delivery of critical items of plant and equipment. These adjustments should assist Powerlink to deliver the amended capex program.

- A factor behind the higher amended capex has been an increase in the allowance for replacement capex. The AER notes that the adjustment affects only the final three

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118 Powerlink engages Downer, BBUGL and John Holland for transmission line construction. Powerlink engages Downer, Tenix and UGI for substation construction.

119 The Oakey substation is part of a joint Powerlink/ Ergon project to enhance supply to Oakey. Powerlink stated that the completion of the Powerlink part of the Oakey project is now targeted for the end of April 2008 to match the timing of Ergon's works to take supply at 33 kV.

years of the regulatory period and that the level of capex in the final three years is significantly below that currently being delivered by Powerlink. As such, the AER considers that this additional capex will not adversely affect the deliverability of Powerlink's overall capex program.

In summary, while Powerlink's amended capex program is challenging—particularly in the first two years of the next regulatory period—for the reasons outlined above, the AER considers that Powerlink has the potential to be able to deliver the program.

4.10 AER's conclusion on the supplementary proposal

Powerlink proposed that its ex ante capex allowance should be increased by $469 million ($2006–07) to allow for the impact of updated information relating to changes in input costs, changes in the probability of scenarios due to the PNG gas pipeline not proceeding, higher demand forecasts and a NEMMCO required monitoring project.[120] The AER has reviewed Powerlink's claims and considers that, based on the information put forward, Powerlink's forecast capex allowance should be increased by $313 million. Table 4.15 shows the expenditure profile of this increased capex.

Table 4.15 AER's conclusion on supplementary proposal ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal[1]	153.68	145.04	16.05	101.21	53.24	469.23
Assets under construction–input costs	–0.16	–	–	–	–	–0.16
Future projects–input costs	–	–3.80	–24.57	–32.71	–27.06	–88.14
PNG–revised probability	–2.88	–2.83	–3.17	–2.84	–1.21	–12.92
Demand forecast	–7.94	2.53	3.45	–53.96	0.90	–55.02
AER's total adjustments	–10.98	–4.10	–24.29	–89.51	–27.36	–156.24
AER's conclusion	142.70	140.94	–8.24	11.70	25.87	312.99

[1] The proposed capex increase of $469 million included expenditure associated with the M50++ sub-theme and undergrounding costs.

The AER has considered Powerlink's request for additional contingent projects in section 3.9 of this decision, and its conclusion on additional opex required due to the changes arising from the supplementary proposal has been added to Powerlink's opex allowance (section 6.9).

120 Note that this amount does not include the reduction identified by Powerlink from a review of the Central Queensland–South Queensland grid section of –$41.03 million. This reduction was included in the AER's draft decision. However, the amount includes expenditure related to undergrounding and the M50++ theme.

4.11 AER's conclusion on total ex ante allowance

In chapter 3, the AER determined that Powerlink's ex ante allowance should be $2249 million ($2006–07) based on an assessment of the proposed capex contained in Powerlink's original application. In addition, based on its review of Powerlink's supplementary proposal and consistent with its findings in this chapter, the AER considers that this allowance should be increased by $313 million.

Further adjustments are required to the supplementary proposal to ensure consistency with the AER's conclusions on Powerlink's original capex proposal.[121] Powerlink also informed the AER that since the supplementary proposal, a number of adjustments have been made to the timing of projects, based on the latest available information.[122] Powerlink advised that these adjustments increase the ex ante allowance by $67 million. The AER has reviewed the adjustments and found them to be appropriate.

The AER's overall conclusion on Powerlink's capex for the next regulatory period is an ex ante allowance of $2629 million. It should be noted that this allowance does not require Powerlink to undertake or not undertake any particular projects. Under the ex ante approach, Powerlink has full operational discretion to allocate its expenditure allowances as it sees fit. In addition, as discussed in section 3.9, the AER has approved an indicative contingent project allowance of $1383 million.

Table 4.16 sets out the AER's conclusion on Powerlink's ex ante allowance.

Table 4.16 AER's conclusion on total ex ante allowance ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's revised proposal	699.99	688.06	472.15	567.70	490.56	2918.46
AER's conclusion on original capex proposal	527.47	452.94	447.63	454.67	366.10	2248.80
AER's conclusion on supplementary proposal	142.7	140.94	–8.24	11.7	25.87	312.99
Other adjustments	21.88	45.84	–17.76	6.15	10.64	66.74
AER's overall conclusion	692.04	639.72	421.63	472.52	402.62	2628.53

[121] The adjustments included the AER's conclusions on load driven projects, the adjustment to expenditure from the AER's conclusion on the M50++ sub-theme and undergrounding expenditure, and cost accumulation factors. Adjustments for CPI changes to the capex were also made.

[122] Powerlink advised that a number of projects have received Powerlink Board approval (or relevant delegated authority) subsequent to the supplementary proposal. Powerlink also included an adjustment for latest timing information for a number of assets under construction.

5 Cost of capital

5.1 Introduction

In the draft decision, the AER provided Powerlink with a nominal vanilla weighted average cost of capital (WACC) of 8.76 per cent. In accordance with clause 11.6.12(d) of the Powerlink transitional provisions, the AER determined the WACC by reference to the specified values, methodologies and benchmarks contained in the new chapter 6A rules. In response to the draft decision, issues were raised about the debt raising and refinancing costs, interest rate hedging costs, equity raising costs and the inflation forecast. This chapter sets out the AER's consideration of these issues.

5.2 Debt raising costs

5.2.1 AER's draft decision

In the draft decision, the AER provided Powerlink with a benchmark allowance of 8.1 basis points per annum (bppa) for debt raising costs based on the methodology recommended by the Allen Consulting Group (ACG) in its 2004 report to the ACCC.[123] Using this methodology, the AER calculated a benchmark allowance using more recent publicly available market data.

5.2.2 Issues raised in submissions

Powerlink stated that an allowance for debt raising costs of 8.1 bppa is too low and is contrary to recent regulatory practice. It engaged the ACG to review the methodology and the conclusions reached by the AER based on the ACG's 2004 report.[124]

The ACG stated that the analysis upon which it estimated the debt raising costs suffered from a number of empirical shortcomings. It noted that in recent years 12.5 bppa has become the de facto regulatory standard among state based regulators, and that the difference between this de facto benchmark and the AER's allowance for Powerlink is immaterial. The ACG also noted that since 2004, it has advised regulators to apply the de facto benchmark and has recommended its continuing application for Powerlink's revenue cap decision. It considered that the objective of regulatory stability outweighed any potential benefit from a revision to the debt raising cost allowance.

Powerlink is therefore seeking a benchmark allowance of 12.5 bppa for debt raising costs and does not believe that there is a compelling reason for departing from this benchmark allowance.

5.2.3 AER's considerations

The AER confirms its decision to provide Powerlink with a benchmark debt raising cost allowance of 8.1 bppa. It notes that the 2004 ACG report analysed the provision of benchmark debt raising costs within the CPI–X framework and developed its

123 ACG, *Debt and equity raising transaction costs: final report to the ACCC*, December 2004.

124 ACG, *Recommendation on regulatory debt raising transaction cost allowance–Memorandum*, 23 January 2007.

recommended benchmark costs based on current and objective market data gathered from publicly available sources at that time as well as on interviews with market participants. Although its analysis may suffer from some empirical shortcomings by the inclusion of data for Australian companies raising debt in the USA, the ACG concluded that its benchmark cost would be a reasonable proxy for the Australian market. Further, the ACG considered that the benchmark debt raising costs it estimated from market data were conservative because they were based on a five year term rather than a 10 year term, which would be more consistent with a 10 year debt margin.[125] Overall, the AER considers that the methodology that the ACG has employed to derive debt raising costs is transparent and that an allowance based on current financial market data provides the best estimate for benchmark debt raising costs. By referencing current market evidence, this approach would provide a TNSP with revenues that would recover the efficient cost of delivering the service.

Powerlink has an opening regulated asset base (RAB) of around $3753 million and the assumed benchmark gearing ratio is 60:40. The notional debt component of Powerlink's RAB is therefore around $2252 million. In accordance with the ACG methodology, this debt size would require about 11 bond issues and would result in a benchmark allowance of 8.1 bppa for debt raising costs. This benchmark is multiplied by the debt component of Powerlink's RAB to provide an average allowance of about $2.2 million per annum ($2006–07), and this amount is to be included in Powerlink's opex allowance during the next regulatory period (see table 6.5).

The fact that the ACG has advised other regulators to apply a value of 12.5 bppa for debt raising costs is not a relevant consideration. The *Statement of principles for the regulation of electricity transmission revenues* (SRP) stated that an assessment of debt raising costs would be undertaken in view of the relatively new nature of such costs in the context of regulatory decisions.[126] In 2004, the ACCC engaged the ACG to develop a methodology for establishing benchmark debt raising costs consistent with market circumstances. Since 2005 the ACCC/AER's regulatory decisions for energy transmission businesses have used the ACG methodology to calculate benchmark debt raising cost allowances. In making these decisions, this approach was considered to provide an appropriate estimate of debt raising costs and was consistent with prevailing market conditions. The AER considers that the choice between a de facto benchmark and a market-based estimate is a discretion for the AER, not the ACG, to exercise.

5.3 Debt refinancing and interest rate risk management costs

5.3.1 AER's draft decision

In the draft decision, the AER did not provide Powerlink with an additional allowance for a clearing spread (refinancing cost) associated with its proposed debt issue. The AER considered that it was not consistent with the benchmark approach to determining the WACC. In addition, the AER did not provide Powerlink with an allowance for interest rate risk hedging costs as it considered the capital asset pricing model (CAPM) framework sufficiently captured interest rate risk.

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125 The AER has employed a 10 year benchmark debt margin in calculating Powerlink's WACC.

126 ACCC, *Statement of principles for the regulation of electricity transmission regulation–background paper*, 8 December 2004, p. 120.

5.3.2 Issues raised in submissions

Powerlink stated that the AER's position in the draft decision does not reflect 'real world' circumstances and that the AER did not consider the pricing pressure (and hence higher associated transaction costs) created by bond issues of the size it proposed in the Australian market. It claimed that the AER's benchmark debt margin allowance does not contain costs associated with determining a market-clearing price for large bond issues. Powerlink believes that it is appropriate to add 7.5 basis points to the debt margin for a clearing spread premium.

Powerlink also stated that it is unaware of any evidence that the CAPM appropriately values interest rate risk, particularly for regulated entities. It argued that the AER should provide an allowance for hedging costs in the absence of such evidence. Powerlink sought a total amount of $4.98 million ($2006–07) for interest rate risk hedging costs to be treated as an operating cost item.

5.3.3 AER's considerations

As part of its assessment of these matters, the AER engaged NERA Economic Consulting (NERA) to provide additional advice on the Powerlink claims.[127] In its report, NERA referred to the term 'hedging' to describe Powerlink's proposed strategies aimed at locking in the interest rates prevailing at the time of the AER's sampling period of bond yields. This includes refinancing its existing debt at that time and entering into forward rate agreements to lock in the cost of borrowing additional funds. NERA stated that substantiating whether interest rate hedging is prudent requires the establishment of criteria for prudence and the provision of an explanation about why the proposed hedging strategy satisfies those criteria.

In the context of a regulatory review, a prudently incurred cost is one that promotes economic efficiency and, in the case of hedging, the relevant benefit is a reduction in risk. For hedging to be efficient, the value of any reduction in risk must be equal to or greater than the cost of achieving it. NERA considered that Powerlink has not demonstrated that its hedging strategies would achieve this. It also considered that even if Powerlink's proposed hedging was efficient, it does not follow that customers should pay for it because the beneficiaries of this reduction in risk are not Powerlink's customers but rather its owners.

NERA also noted that finance literature includes numerous empirical studies that suggest that the CAPM does not fully explain stock returns. Of particular note, Fama and French's empirical testing of the CAPM has formed the basis of significant research on the power of the CAPM and alternative models of risk pricing.[128] NERA stated that despite uncertainty over how to price risk, there are no suggestions that the optimal risk management strategy for businesses is to eliminate all risk. It considered that even if the CAPM is a poor predictor of how the market prices risk, the AER's use of CAPM provides Powerlink with compensation for risk.

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127 NERA Economic Consulting, *Hedging for regulated businesses*, 12 April 2007.

128 Fama, E. F. and French, K. R., *The Cross-section of expected stock returns*, Journal of Finance, vol. 47, no. 2, 1992, pp. 427-465.

Fama, E. F. and French K. R., *The CAPM is wanted: Dead or alive*, Journal of Finance, vol. 51, no. 5, 1996, pp. 1947-1958.

NERA then noted that Powerlink has not presented information that suggests that the total compensation for risk would be higher if a superior model to CAPM was applied. In the absence of such evidence, NERA concluded that Powerlink has not provided a persuasive case for the recovery of costs associated with its identified hedging strategies.

The AER has reviewed the information put forward by Powerlink and NERA's advice, and considers it is appropriate to maintain the position it took in the draft decision. Accordingly, the AER has not allowed Powerlink an additional amount for debt refinancing and interest rate risk management costs.

5.4 Equity raising costs—2001 opening asset base

5.4.1 AER draft decision

The AER's draft decision did not provide Powerlink with an allowance for equity raising costs associated with its 2001 opening RAB. This was based on the ACG's advice that if the RAB had already been established and was being used to determine revenues under the building block approach then equity raising costs must be considered to be incorporated into the RAB.

5.4.2 Issues raised in submissions

Powerlink stated that the AER is being inconsistent with previous decisions (e.g. the ElectraNet 2002 revenue cap decision) by not considering an allowance for equity raising costs for it on the basis that it was not included in Powerlink's 2001 revenue cap application. It also stated that it had not sought an allowance for equity raising costs in its 2001 decision because at that time the regulatory principles did not provide, or mention, an avenue to do so.

Further, Powerlink noted that at the time of its 2001 revenue cap decision there had been no indication that the RAB would be 'locked in' and rolled forward—the decision to lock in and roll forward the RAB was made when the SRP was released in December 2004. Powerlink argued that failure to acknowledge this was inconsistent with the ACG's recommendation and that the AER should therefore provide an operating allowance for equity raising costs associated with its 2001 RAB, based on the benchmark value of 3.83 per cent.

Queensland Alumina Limited supported the draft decision because it considered that Powerlink's initial RAB had incorporated all capital costs.

5.4.3 AER considerations

After considering the submissions made on this issue, the AER is still of the view that it is reasonable to maintain the position it took in the draft decision. It considers that it is not appropriate to provide Powerlink with an allowance for equity raising costs associated with its 2001 opening RAB.

The AER's position is consistent with previous decisions. The draft decision noted that Powerlink did not request an allowance for equity raising costs in relation to the opening RAB in its 2001 revenue cap application. In subsequent revenue reset processes in 2002, such allowances were provided for ElectraNet and SPI PowerNet. As noted by

Powerlink, these decisions coincided with the setting of the access arrangement for GasNet in 2002. In the GasNet final decision, the ACCC recognised that there were different views on the validity of providing an allowance for equity raising costs.[129] In the ElectraNet and SPI PowerNet decisions, the ACCC noted that this was a new area of analysis and that it would consider this issue further when making regulatory decisions in the future.[130] In the SRP, it was decided that a review of equity raising costs would be undertaken because of the relatively new nature of such costs in the context of regulatory decisions.[131]

The ACCC engaged the ACG to undertake a review of the legitimacy of regulated utilities recovering equity raising costs and the benchmark value of such costs. In its 2005 TransGrid revenue cap decision, the ACCC did not provide an allowance for equity raising costs because the RAB was already established and would be rolled forward.[132] This decision followed further consideration by the ACCC of the issue and, in particular, the conclusions of the ACG report.

The AER is of the view that the relevant issue being considered is whether a RAB has been established. As the ACCC had already determined Powerlink's RAB in its 2001 revenue cap decision, and that the RAB is being rolled forward, there is no case to include an equity raising cost allowance in this revenue cap decision retrospectively. The ACG's conclusions also support this view. In its 2004 report, the ACG stated that when a RAB has already been established for a regulated firm, there is no case to include an allowance for equity raising costs:

> …For government owned entities there is similarly no reason to allow initial equity raising transaction costs if there is an established RAV [regulatory asset value], as they can be considered to be implicitly or explicitly incorporated into it. The issue is not whether the utility today is a publicly listed or privately owned, or a government owned business. A company representing the same group of physical assets could have moved through all three of these ownership categories. However, the transaction costs, including IPO [initial public offer] costs (as a proxy) and advisers' fees associated with each of these ownership structures are not relevant to the RAV. They cannot be added to the RAV, or customers would be subsidising what is the pursuit of private (or public) gain through the achievement of synergies or government policy objectives. Thus, the issue is whether an RAV has already been established.[133]

The ACG concluded that when a RAB has already been established and has been used to determine revenues based on the building block approach, equity raising costs must be considered to be already incorporated in the RAB.[134]

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129 ACCC, *GasNet Australia access arrangement revisions for the principal transmission system, final decision*, 13 November 2002, p. 149.

130 ACCC, *South Australian transmission network revenue cap 2003–2007/08, decision*, 11 December 2002, p. 26-28.
ACCC, *Victorian transmission network revenue caps 2003–2008, decision*, 11 December 2002, p. 86-87.

131 ACCC, *Statement of principles for the regulation of electricity transmission regulation–background paper*, 8 December, p. 120.

132 ACCC, *NSW and ACT transmission network revenue cap TransGrid 2004–05 to 2008–09, decision*, 27 April 2005, p. 146-147.

133 ACG, *Debt and equity raising transaction costs: final report to the ACCC*, December 2004, p. 55.

134 ibid., p. 61.

5.5 Equity raising costs—forecast capital expenditure

5.5.1 AER draft decision

In the draft decision, the AER did not allow any provision for equity raising costs associated with Powerlink's capex in either the current and next regulatory periods on the basis of the 'pecking order theory' of capital structure. Specifically, there was no evidence to suggest that Powerlink's internally generated cash flows and borrowings were insufficient to finance its capex.

5.5.2 Issues raised in submissions

Powerlink engaged the ACG to test the pecking order theory by determining the amount of equity it would need to raise to finance its capex for the next regulatory period, based on benchmark financing arrangements, and the transaction cost that would be incurred to raise equity.[135] The ACG noted that Powerlink's capex over the next regulatory period represents up to 14 per cent of its opening RAB. Given this proportion of capex relative to the RAB, the ACG considered that it was not obvious that a firm with benchmark financing arrangements could raise the required capital without new equity issues.

The ACG developed a cash flow analysis model using the draft decision figures and established that Powerlink would require benchmark equity funding of $541 million during the next regulatory period. The total amount of equity raising cost for the next regulatory period was estimated to be $16.2 million based on a benchmark allowance of 3 per cent for subsequent equity issues. In light of the ACG's advice, Powerlink considered that there is evidence to demonstrate that retained earnings and additional borrowings are insufficient to fund its forecast capex requirement consistent with the assumed benchmark level of equity. Powerlink also applied the same analysis to its capex program for the current regulatory period. This analysis indicated that equity raising cost would not be required.

5.5.3 AER considerations

The AER has reviewed the ACG's analysis of Powerlink's benchmark cash flows to establish the requirement for equity raising costs associated with the equity component of its forecast capex over the next regulatory period.[136] The methodology applied to determine equity raising costs is summarised by the following steps:

- revenues less expenses (including opex, interest payments and tax) provides the internal cash flow
- internal cash flow less dividends to shareholders provides the retained cash flow
- retained cash flow is used to fund the equity component of capex
- unused retained cash flow, consistent with the pecking order theory, is carried over to the following year to fund the equity component of capex

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135 ACG, *Estimation of Powerlink's SEO transaction cost allowance–Memorandum*, 5 February 2007.

136 The AER employs a benchmark debt to equity (gearing) ratio of 60:40.

- equity component of capex less retained earnings (where it is insufficient) indicates the additional equity required

- equity raising cost is calculated by multiplying the additional equity required with the assumed benchmark transaction cost of 3 per cent for subsequent equity issues.

The AER considers that this approach to determining an allowance for equity raising costs is reasonable and is consistent with the principles of benchmark financing arrangements. An efficient firm with a challenging capital program is likely to ensure that its internally generated cash flow is used first to fund its capex. The AER, however, considers that it is reasonable to accept ACG's approach which recognises that firms—including those with challenging capital programs—typically distribute a proportion of their profits to shareholders. The AER is of the view, however, that the dividends assumption in relation to the yield being applied under the ACG's cash flow analysis should be modified.

The ACG has assumed that the benchmark firm will maintain a dividend yield of 8 per cent based on a sample of listed Australian regulated utilities. The AER has reviewed this sample and does not consider it appropriate for the purposes of determining a benchmark dividend yield. Unlike Powerlink, the capex growth rates of the entities in the sample, relative to their asset bases, average around 3 per cent.[137] The AER notes that Powerlink faces an average capex growth rate of 12 per cent during the next regulatory period. This suggests that a dividend yield assumption of 8 per cent may be inconsistent with the capex profile of businesses with high capex growth rates, like Powerlink.

Further, the entities in the sample have financial interests in other firms that provide utility services—that is, rather than directly own or operate like service providers they acquire interests in them. These entities also operate through trust structures that provide for different tax treatment than companies and are able to distribute dividends that can comprise an effective return of capital. Therefore, the dividend yield is not directly comparable with that of a company.

To obtain an appropriate dividend yield benchmark, the AER has sampled a number of listed companies as shown in table 5.1. Although these companies do not operate in the same sector as Powerlink, they have some similarities in terms of capex growth rates that are comparable to Powerlink and operate as direct service providers. These companies faced an average capex growth rate ranging from 6 per cent to 11 per cent between 2005 and 2006, with corresponding dividend yields averaging 3.5 per cent. This outcome appears reasonable because a lower dividend yield generally indicates that a company is retaining profits to fund capex.

[137] The capex growth rate was calculated using the firm's capital purchase of plant, property and equipment divided by its total assets. These figures were obtained from financial statements contained in annual reports.

Table 5.1 Sample companies—net dividend yields and capex growth rates (%)

Company	Net dividend yield	Capex growth rate
Alcoa	1.8	8.6
BHP Billiton	1.7	10.8
Bluescope Steel	4.6	10.5
Boral	4.1	8.6
CSR	4.3	9.0
Downer EDI	3.1	7.2
OneSteel	3.5	6.3
Rinker	2.2	8.6
Rio Tinto	1.8	11.5
Wesfarmers	6.4	8.2
Zinifex Limited	4.9	11.8
Average	3.5	9.2

Source: Bloomberg—12 months net dividend yields at March 2007; 2006 company annual reports.
Note: The capex growth rate was calculated by the capital purchase of plant, property and equipment divided by total assets.

Using this benchmark dividend yield and the updated revenues, expenses and capex allowances provided in this final decision, the benchmark cash flow analysis shows the retained cash flow available to Powerlink during the next regulatory period (table 5.2).

Table 5.2 AER's benchmark cash flow analysis ($m, nominal)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Revenue	536.81	615.28	679.77	721.51	777.55	3330.91
Operational expenditure	–147.63	–156.76	–169.18	–166.98	–177.30	–817.84
Interest payment[1]	–153.57	–181.93	–208.64	–226.40	–247.01	–1017.55
Tax payment	–41.00	–45.22	–45.01	–47.96	–52.43	–231.61
Internal cash flow	194.62	231.37	256.94	280.17	300.81	1267.58
Dividend payment	–59.30	–68.50	–75.29	–82.04	–88.34	–373.47
Retained cash flow	135.31	162.87	181.66	198.13	212.47	890.43

[1] The interest payment has been adjusted to reflect the interest payable on the opening RAB consistent with the modelling contained in the AER's post-tax revenue model.

Table 5.3 shows the additional equity requirement to fund capex after retained cash flows are taken into account according to the pecking order theory. Because capex can be lumpy, the AER has undertaken the cash flow analysis over the next regulatory period to obtain the net equity requirement. Although an assessment over a five year period is considered reasonable in this case, going forward, it may be appropriate to take a longer-term perspective to allow the inclusion of possible earnings from previous or subsequent regulatory periods in the cash flow analysis.

Table 5.3 AER's benchmark capex funding requirement ($m, nominal)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Capital expenditure funding	733.02	698.96	475.21	549.34	482.84	2939.37
Debt funding component	439.81	419.38	285.12	329.61	289.71	1763.62
Equity funding component	293.21	279.58	190.08	219.74	193.14	1175.75
Less retained cash flow	135.31	162.87	181.66	198.13	212.47	890.43
Additional equity requirement	157.90	116.72	8.43	21.61	–19.33	285.31
Equity raising cost	4.74	3.50	0.25	0.65	–0.58	8.56

The AER notes that the ACG's cash flow analysis does not consider other equity raising options that involve lower or even zero transaction costs. While the AER accepts this approach for this decision, it is aware that other options commonly employed by firms to finance capex include dividend reinvestment plans, share purchase plans and private placements. It may be necessary to consider these alternatives in future decisions.

Based on the capex allowance over the course of the next regulatory period and a benchmark gearing ratio of 60:40, the analysis indicates that the total amount of additional net equity required by Powerlink is $285 million. In accordance with the ACG's methodology and based on the benchmark transaction cost of 3 per cent for subsequent equity issues, the total amount of benchmark equity raising costs associated with Powerlink's capex for the next regulatory period is $8.6 million. Consistent with the recommendation made by the ACG in its 2004 report, the AER has included this amount as an allowance in Powerlink's RAB.

5.6 Estimating forecast inflation and the real risk-free rate

5.6.1 AER draft decision

In the draft decision, based on past regulatory practice in Australia, the AER adopted a forecast inflation rate of 3.15 per cent. This rate was determined by the difference between observed nominal and indexed (real) Commonwealth government securities (CGS) yields using the Fisher equation.[138] Although the forecast inflation rate is not an explicit parameter in the WACC calculation when expressed in real terms, it is used in the AER's post-tax revenue model (PTRM) to forecast nominal allowed revenues.

5.6.2 Issues raised in submissions

Powerlink and TransGrid noted that there is some concern among the financial community that the methodology currently used by regulators to forecast inflation may not provide an accurate inflation forecast. The EUAA stated that the AER's inflation forecast of 3.15 per cent was overly pessimistic and argued that recent interest rate rises would likely result in inflation falling back within the RBA's target range of 2–3 per cent during Powerlink's next regulatory period.

[138] (1+ inflation rate) = (1 + nominal bond rate) ÷ (1 + real bond rate).

On 30 March 2007, Powerlink provided additional information to the AER on the estimated inflation forecast used in its draft decision. Powerlink's submission related to an apparent observed bias in the yields of indexed CGS used as proxies for the real risk-free rate. Powerlink's submission referred to the findings of a NERA report, commissioned by the Energy Networks Association (ENA).[139] In its report, NERA stated that there is an observed relative downward bias between the indexed and nominal CGS yields used as proxies for the risk-free rate. NERA contended that since late 2004, the falling supply of and the increased demand for CGS has depressed indexed CGS yields relative to those of comparable corporate bonds.

NERA identified that the spread in yields between indexed corporate bonds and indexed CGS has risen relative to the spread in yields between nominal corporate bonds and nominal CGS. This observed divergence between indexed and nominal CGS imparts a downward bias to the real risk-free rate in the CAPM, and NERA estimated that the downward bias in the indexed CGS yield is in the order of 20 basis points. Based on this analysis, Powerlink stated that 20 basis points should be added to the observed CGS yields used as proxies for the real risk-free rate.

NERA also indicated that it was conducting ongoing research to investigate the existence of an absolute bias in nominal CGS yields. Its preliminary view was that there seemed to be a downward bias of 42 to 44 basis points in the nominal CGS yields.

Based on NERA's findings, Powerlink has proposed an upward adjustment of 20 basis points to the real risk-free rate determined in the AER's draft decision. Such an adjustment results in a corresponding 20 basis point decrease in the inflation forecast (2.95 per cent), as calculated by the Fisher equation. All other things being equal, the adjustment to the real risk-free rate will result in higher allowed revenues over the next regulatory period—that is, increases the real rate of return.

5.6.3 AER considerations

Powerlink first flagged its concern about the inflation forecast in its submission following the draft decision on 9 February 2007. It advised that NERA had been studying the issue since late 2006 and that the details of its concerns and the associated effect on the draft decision would not be available until the NERA study was completed. On 30 March 2007, Powerlink submitted a report by NERA that had broader findings than methodological concerns regarding the estimate of forecast inflation. The AER sought comment on this submission, particularly on whether the issues raised in it could be addressed in time for the final decision.

Submissions from a number of network service providers generally stated that the evidence based on NERA's study was sufficient to accept that the need to make an upward adjustment of 20 basis points to the indexed CGS yields. The EUAA, however, opposed the change and stated that it would be inappropriate to rely on one piece of research work prepared for network service providers. It noted that consideration of the appropriate risk-free rate is a complex matter that will have flow on implications. The

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[139] NERA Economic Consulting, *Bias in indexed CGS yields as a proxy for the CAPM risk free rate*, March 2007.

EUAA also noted that it is not possible for regulators and stakeholders to give this issue due consideration in the short time available before the final decision is due to be made.

The AER has reviewed Powerlink's submission and the NERA study, and this review has raised several other issues requiring more detailed investigation. These issues include whether:

- demand/supply imbalances in the CGS are the only reason for the relative differences between indexed and nominal yields. For example, do other characteristics of the corporate bond market, such as credit risk and industry perceptions, influence investor preference and therefore affect the findings

- corporate bond comparisons used in the analysis are appropriate without further scrutiny of associated market structures, given that these bonds operate in thinner markets than CGS bonds

- sufficient available data is used in the analysis to provide the confidence required to support the proposed adjustment

- analysis of the alleged bias is based on a short-term anomaly or will remain stable in the future.

The AER notes that NERA's study regarding the need to adjust the observed indexed CGS yields has also been raised as part of the Essential Services Commission's (Victoria) current review of gas access arrangements for 2008. In a report on the WACC proposal submitted for several gas distribution network service providers, KPMG noted the recent findings from NERA's study into the existence of bias in indexed CGS yields. It concluded, however, that a conservative position at this stage was warranted and did not include an allowance for the bias in its estimate of the real risk-free rate. Specifically, KPMG stated that:

> This does not imply our lack of acceptance of the results of NERA's study, but rather, reflects our view that a conservative position is warranted at this stage given that the study is recent, currently unpublished and yet to be subject to academic scrutiny…[140]

Further, the risk-free rate is an important parameter underpinning the CAPM framework. Any adjustments to market determined CGS yields need to consider the impact on other parameters such as the market risk premium and the cost of debt. Finally, the AER notes that the analysis on a possible downward bias with the nominal CGS is incomplete and is subject to further research by NERA.

The AER does not believe the alleged bias in the indexed CGS yields can be considered in isolation. The AER agrees with the EUAA that the Powerlink submission has significant implications for stakeholders in Queensland and in other jurisdictions. Further work is required to review the conclusions in the NERA study and to consider the other issues that it raises, including the possibility of a bias in nominal CGS yields and possible implications for the CAPM. While the AER has commenced this investigation, it cannot be completed in the time remaining for finalising this decision.

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[140] KPMG, *2008 Gas access arrangement review—weighted average cost of capital*, March 2007, p. 25.

Transparency and fairness requires the AER to investigate the NERA study properly and to allow stakeholders to respond before departing from a well established methodology for forecasting inflation from observed yields. Although this could have been undertaken had this issue been raised at an earlier stage of the AER's process, it is not possible given the timing of this submission, to complete this assessment before the commencement of the next regulatory period.

The use of the Fisher equation to derive inflation forecasts is a well established practice among Australian regulators. It has been widely accepted as an appropriate method of forecasting inflation. The AER considers that until a thorough analysis of NERA's study has been undertaken, the forecast inflation rate used in revenue caps should continue to be determined by the difference between nominal and indexed CGS yields obtained from the financial market. The use of the latest market based data is objective and transparent and avoids the need for assumptions regarding future inflation. The inflation forecast derived from the Fisher equation also maintains consistency with other financial parameters used in the regulatory framework. Accordingly, the AER considers that its inflation forecast of 3.15 per cent in the draft decision is consistent with the capital market conditions that applied when the CGS yields were sampled.[141] For this final decision, the AER has decided to apply a forecast inflation rate of 3.15 per cent per annum based on market determined nominal and indexed CGS yields.

5.7 AER's conclusion

The AER's conclusion is to provide Powerlink with a nominal vanilla WACC of 8.76 per cent. The WACC parameter values are set out in table 5.4. The AER has not updated the WACC in this final decision because the averaging period for the bond rates was fixed and the other parameters were prescribed by the new chapter 6A rules.

The AER has further considered issues raised in the submissions and has decided to maintain the positions it took in its draft decision, specifically to:

- provide Powerlink with a benchmark allowance of 8.1 bppa for debt raising costs
- not allow Powerlink an additional amount for debt refinancing and interest rate risk management costs
- not provide Powerlink with an allowance for equity raising costs associated with its 2001 opening RAB
- apply a forecast inflation rate of 3.15 per cent per annum based on market determined nominal and indexed CGS yields.

However, the AER has decided to change its position from that contained in the draft decision on equity raising costs associated with Powerlink's forecast capex. The AER has allowed Powerlink a benchmark amount of $8.6 million for equity raising costs associated with its capex over the next regulatory period.

[141] The sampling period for the yields was from 6 November to 1 December 2006 (20 days).

Table 5.4 Comparison of cost of capital parameters

Parameter	AER's conclusion	Powerlink's proposal[1]
Nominal risk-free rate	5.68 %	5.28 %
Real risk-free rate	2.45 %	–
Expected inflation rate	3.15 %	2.91 %
Debt margin	1.14 %	1.10 %
Cost of debt	6.82 %	6.38 %
Market risk premium	6.00 %	6.00 %
Gearing	60 %	60 %
Value of imputation credits (gamma)	0.50	0.50
Equity beta	1.00	1.00
Nominal post-tax return on equity	11.68 %	–
Post-tax nominal WACC	7.01 %	–
Pre-tax real WACC	5.95 %	–
Nominal vanilla WACC	8.76 %	8.34 %

[1] Powerlink's proposal in April 2006.

6 Operating and maintenance expenditure

6.1 Introduction

The AER's draft decision provided Powerlink with an opex allowance of $713 million ($2006–07) during the next regulatory period. Powerlink's total proposed opex allowance was $787 million. The average annual opex allowance was $143 million compared to Powerlink's proposed average annual opex allowance of $157 million.

The AER received submissions on the draft decision from Powerlink and other interested parties. Issues raised in submissions included labour and maintenance materials escalators, asset growth cost drivers, vegetation management, self insurance allowance, efficiency benefit sharing and benchmarking measures. The AER has considered submissions and, where appropriate, has sought further advice from its consultants before making its final decision.

This chapter sets out issues raised in submissions on the draft decision and the AER's consideration of those issues.

6.2 Labour cost escalator

6.2.1 AER's draft decision

Powerlink proposed labour escalators for 2005–06, 2006–07 and 2007–08 based on its current enterprise bargaining agreement with its employees.[142] Further, it proposed labour escalators for the final four years of the next regulatory period of 5.6 per cent per annum.

PB recommended accepting Powerlink's proposed labour cost escalators except for the final two years but also recommended reducing the labour escalator to 4.6 per cent in the final two years of the next regulatory period, reflecting an expectation of an easing of the tightness in the labour market. PB's estimate of 4.6 per cent was based on a historical average of wages growth in the utilities sector in Queensland.

The AER sought labour cost forecasts from Access Economics. Using its macro economic model, Access Economics estimated labour cost growth forecasts for the Queensland utilities sector of 5.8 per cent in 2007–08, reducing to 3.5 per cent in 2009–10 and 2010–11 before increasing to 4 per cent in 2011–12.

In the draft decision, the AER decided to apply Access Economics' labour cost forecasts for the period from 2008–09 to 2011–12. This reflected the AER's view that a Queensland specific forecast was likely to be a better predictor of future trends than a historical average.

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142 Powerlink forecast its opex requirements using 2004–05 as the base year, which was the latest year for which audited financial data was available at the time.

6.2.2 Issues raised in submissions

Powerlink stated that the AER should not rely on the Access Economics labour cost forecast for the last four years of the regulatory period. Powerlink engaged Synergies Economic Consulting Pty Ltd (Synergies) to review the Access Economics report. Synergies considered that Access Economics' forecasting approach contained modelling and methodological shortcomings. Powerlink also claimed that its circumstances are closely aligned with the mining and construction sectors in Queensland. It stated that the AER should not use labour escalation factors lower than those proposed by Powerlink.

ElectraNet questioned whether the low wage growth forecasts of 3.5 to 4.0 per cent were adequate to maintain a skilled workforce.

EnergyAustralia stated that the labour cost forecasts put forward by Powerlink reflect market conditions and the increased competition for electrical workers. EnergyAustralia and TransGrid also questioned whether the inflation assumption used by Access Economics and the AER in its post-tax revenue model (PTRM) were consistent. TransGrid also provided an analysis of Access Economic's labour cost forecasts undertaken by NERA.[143]

Ergon stated that it worked in the same environment as Powerlink and that contractors engaged to work for Ergon were often the same contractors employed by Powerlink. Ergon supported Powerlink's claim that the drivers for wage growth were the skills shortage in the electricity industry and enterprise bargaining agreement wage increases, which were generally greater than CPI to attract and retain labour in Queensland.

Energex stated that the AER's proposed labour escalators for 2009–10 to 2011–12 were below the historical rate of growth in the utilities and mining sector. It recommended that the AER re-examine the labour cost escalators particularly from 2009–10.

The EUAA agreed with the AER's decision to allow Powerlink's labour cost escalator of 5.8 per cent for 2007–08. It also agreed that by the end of the decade, wages growth would fall to a more sustainable level.

Queensland Alumina (QAL) supported the AER's adoption of Access Economics' labour cost escalators apart from the 5.8 per cent rate for 2007–08. QAL suggested that wage rates would ease due to industry consolidation and subsequent efficiency savings.

6.2.3 AER's considerations

The AER still considers that a Queensland specific forecast of labour costs, based on macro economic modelling will provide efficient labour cost escalators for the next regulatory period. Such a forecast would provide a sound basis for the cost escalators as it takes into account specific influences in the Queensland economy, as well as national and global trends.

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143 TransGrid, *Powerlink draft revenue cap decision – TransGrid submission*, 7 February 2007.

The AER re-engaged Access Economics to review its forecasts of labour growth developed for the AER in November 2006. In particular, Access Economics was required to provide:

- a forecast of annual labour cost growth from 2006–07 to 2015–16 for the mining, utilities and construction sectors by state and nationally
- a forecast of annual labour cost growth from 2006–07 to 2015–16 for a weighted average of mining, utilities and construction sectors by state and nationally
- a forecast of annual labour cost growth from 2006–07 to 2015–16 for each state and nationally.

Access Economics was also required to provide a commentary on its forecasts including a description of the methodology used to develop the forecasts, a description of the assumptions used in the modelling and a response to key issues raised in the Synergies and NERA reports.

The April 2007 Access Economics report responds to specific issues raised by interested parties and its revised forecast takes into account the impact of the mining and construction sectors on the cost of labour employed by Powerlink. Key influences on the labour cost forecasts prepared by Access Economics include:

- an expected downturn in the construction industry in 2009–10
- a fall in employment in the mining sector as new mines shift from the construction phase to the production phase
- a fall in employment in the utilities sector due to a tailing off of the commodities boom
- continued strong growth in the Queensland economy.

Access Economics considered these factors in preparing its labour cost forecasts for the utilities, mining and construction sectors in Queensland, and then combined these separate forecasts into a composite forecast. The composite forecast is based on indicative weightings of each sector provided by Powerlink. The mining sector has been given the greatest weight (57.1 per cent), followed by construction (28.4 per cent) and utilities (14.5 per cent) sectors.

The Access Economics report sets out the assumptions and information used to develop the labour cost forecasts and the AER considers that these assumptions are reasonable. Further, the AER considers that the Access Economics analysis shows a sound understanding of the factors influencing labour costs in Queensland, from both the demand and the supply perspective. In particular, Access Economics has emphasised a likely supply response to current labour shortages, including overseas recruitment, increasing university places, internal migration and changing production techniques. Access Economics stated:

> … there has been a leap in demand for the skills used in mining, construction and the utilities in recent years, but that demand growth is set to slow, and the supply side of the labour market is already adjusting. Ultimately, if there is a leap in demand for a particular skill and a related leap in wages compared to underlying productivity associated with that skill, then more people will eventually move into that line of work. That is why extrapolating current conditions across the next five to ten years would be short-sighted.[144]

The AER notes that a report prepared by BIS Shrapnel made similar assumptions about future trends in the economy, including a fall in wages growth in 2008–09 and 2009–10, and a decline in employment in the utilities sector between 2006 and 2007 from which employee numbers will not recover until 2012.[145]

The AER has decided to apply the revised Access Economics forecasts of labour costs for Queensland (2008–09 to 2011–12), for the composite sector. The AER has ensured that these forecasts take into account the different inflation assumptions used by Access Economics and the Powerlink opex model. Table 6.1 shows the real labour cost escalators applied in this decision.

Table 6.1 AER's conclusion on real labour costs escalators (%)

	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Powerlink	9.04	4.86	2.84	2.61	2.61	2.61	2.61
Access Economics	–	–	–	4.30	1.50	1.70	3.00
AER's conclusion	9.04	4.86	2.84	4.30	1.50	1.70	3.00

6.3 Maintenance materials cost escalator

6.3.1 AER's draft decision

In the draft decision, the AER observed that base metal prices increased significantly in the latter years of the current regulatory period but noted that forecasts from the Australian Bureau of Agricultural and Resource Economics (ABARE) indicated prices were likely to ease in the short to medium term as supply increases to meet demand.

Powerlink used a materials cost escalation rate of 4 per cent per annum for opex in the next regulatory period compared with an escalation rate of the CPI for capex. Powerlink did not supply any specific information to justify this difference. PB reviewed Powerlink's materials cost escalator and stated that the CPI is a more usual escalator used by network service providers. The AER decided to apply an escalation factor of the CPI as it reflected the projected decline in base metal prices and maintained consistency with the capex materials escalator.

6.3.2 Issues raised in submissions

Powerlink stated that it disagreed with the AER's revised maintenance materials cost escalator. It restated its claim that maintenance materials costs will continue to increase and added that producing a weighted average of materials cost increases would be too

144 Access Economics, *Labour cost indices for the energy sector*, 12 April 2007, p. ii.

145 BIS Shrapnel, *Outlook for Wages to 2012/13: electricity, gas and water sector Australia and Victoria*, March 2007.

data and resource intensive. Powerlink also stated the escalation of maintenance materials costs at 4 per cent was unlikely to capture all maintenance materials price increases.

EnergyAustralia provided ABS data that indicated electrical wire and electrical equipment costs have increased at a rate higher than CPI. EnergyAustralia also included its own projections for 2007 to 2009 that indicate electrical wire and electrical equipment costs would escalate at a rate of 5 per cent per annum.

Energex stated that its recent research into materials costs indicated that increases were three to four times the official inflation figure from the ABS, however, this research was not provided. Energex stated that the AER should accept Powerlink's proposed maintenance materials cost escalation rates.

Ergon stated that most materials for the electrical industry are imported and buyers are price takers in a world market. Ergon stated that the AER should use an industry specific index when forecasting materials cost escalators.

Transend stated that it did not consider the inconsistency between Powerlink's proposed capex and maintenance materials cost escalators to be a significant issue.

QAL queried whether Powerlink's materials cost escalators were already included in opex forecasts. It stated that this would occur if forecasts were developed in nominal dollars and provided to the AER in constant dollars. QAL also considered materials costs to be diversifiable and that Powerlink can reduce costs further by managing its inventory more efficiently.

6.3.3 AER's considerations

To understand why maintenance and capex materials should have different escalators, the AER sought further information from Powerlink. Powerlink stated the differences include:

- higher embedded labour costs due to more labour intensive manufacturing and transport cost components
- higher handling, spares management, storage and warehousing costs
- performance testing costs for electronic spares
- savings arising from bulk purchasing of capex materials.

Powerlink also stressed that maintenance materials tend to be bought as component parts rather than as complete pieces of equipment, as is used for capex. For example, Powerlink stated that maintenance materials would often be operating rods, mechanisms or seals for circuit breakers but only occasionally would be a complete circuit breaker.

Powerlink also noted that ongoing repairs generally use technology compatible with the original piece of equipment. Hence, maintenance materials are sourced from a variety of suppliers, to meet a variety of design standards, rather than simply purchasing bulk

supplies of equipment with the most up-to-date design standards, as is the case for capex materials.

PB acknowledged differences in the mix of materials used for maintenance compared with greenfields capex, but considered that many maintenance materials are the same as those used in capex. Further, PB noted that long-term purchasing contracts can be, and are used to manage short-term fluctuations in metals and other raw materials prices.

While Powerlink has described several differences in storage and handling practices between maintenance and capex materials, it is unclear whether these would lead to a substantial difference in costs. For example, bulk purchases of capex materials should result in cheaper unit costs, and could easily incorporate spares for later maintenance work. The AER accepts PB's contention that many elements of materials are the same for maintenance as they are for capex work.

PB was of the view that the additional information provided by Powerlink about maintenance materials is not sufficiently compelling to alter its original view or recommendation. PB has restated its recommendation that maintenance materials be escalated by the CPI for the next regulatory period.

The AER notes PB's claim that escalating materials costs at CPI is standard industry practice. It also notes SPAusNet has used the CPI as its miscellaneous materials escalator in its recent revenue proposal.[146] Consistent with PB's advice, the AER has decided to apply the industry standard of the CPI to escalate Powerlink's opex materials.

In response to QAL's concerns the AER's modelling has ensured that cost escalators are not double counted. Powerlink's forecasts are developed in nominal dollars and are de-escalated to 2006–07 dollars. The AER's modelling in the PTRM then escalates the opex allowance at forecast inflation.

The AER also considers that Ergon's suggestion that materials costs should be escalated by an industry specific index has some merit. The AER will consider developing such an index for future revenue resets.

6.4 Asset growth and condition based maintenance

6.4.1 AER's draft decision

PB advised that new assets should not require condition based maintenance for at least five years from the date of commissioning. In the draft decision, the AER accepted PB's recommendation that Powerlink's condition based maintenance costs be held constant over the next regulatory period.

6.4.2 Issues raised in submissions

Powerlink disagreed with PB's assertion that newly commissioned assets do not require condition based maintenance.

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146 SP AusNet, *Electricity transmission revenue proposal 2008/09–2013/14*, 31 March 2007, p. 81.

Powerlink considered that PB reached an incorrect conclusion in asserting that asset growth escalation is not applicable to condition based maintenance for the five years of the next regulatory period. It stated that condition based maintenance is conducted to develop knowledge of assets and may include visual non-intrusive inspection, workshop testing and remote, automated condition monitoring.

Powerlink also sought advice from The Asset Partnership, which stated that condition based maintenance is required for assets of all ages, including new assets.[147] Powerlink considered that the AER should reject PB's recommendation and reinstate its forecast for condition based maintenance costs.

6.4.3 AER's considerations

Powerlink has provided more information regarding its condition based maintenance program, including a report from The Asset Partnership. PB has also clarified the rationale underpinning its original recommendation to hold condition based maintenance costs constant.

PB advised that its recommendation reflected its view that new assets do not require as much overall maintenance as older assets, but it accepted that condition based monitoring or maintenance is undertaken on new assets. PB has indicated that corrective maintenance costs, particularly in the period after commissioning, will be lower due to manufacturer and contractor warranties. Further, it considers that routine maintenance tasks on new assets will not be as frequent as for older assets.

PB considered that new assets require less maintenance overall than older assets, where that maintenance includes monitoring, preventative maintenance and corrective maintenance. Hence, PB stated that it was not appropriate to expend the same maintenance effort on new assets as on older assets. PB's recommended adjustment is not based on a detailed analysis of specific asset maintenance costs and practices. Rather, PB has recommended holding the condition based maintenance component of the field maintenance costs constant over the next regulatory period as a reasonable approximation of the lower maintenance costs associated with new assets.

The AER has considered PB's recommendation and its advice that new assets are unlikely to require the same level of routine and corrective maintenance as older assets. The AER has also considered PB's advice to hold the condition based maintenance requirement constant to be a reasonable proxy for the reduction in routine and corrective maintenance. The AER has decided to accept PB's recommendation, but notes that this does not imply that condition based maintenance should not be undertaken on new assets, but rather that new assets have less overall maintenance costs than older assets.

6.5 Land (vegetation) management

6.5.1 AER's draft decision

Vegetation management issues include all aspects of land management including control of vegetation and weeds, environmental issues, cultural heritage, and erosion.

147 For information see The Asset Partnership, www.assetpartnership.com.

PB recommended that the work effort associated with vegetation management be increased by 6 per cent for 2005–06, 4 per cent for 2006–07, 2 per cent for 2007–08 and 1 per cent thereafter. PB stated that this approach attempted to capture the significant initial increase in effort generated by the new policy, but acknowledges that the work effort should reduce over time.

In the draft decision, the AER considered that new vegetation management requirements would have a significant impact on Powerlink's costs in the short term. However, the AER agreed with PB that long-term efficiencies are likely to be achieved with appropriate species management and specialised pruning. The AER adopted the escalators for vegetation management proposed by PB.

6.5.2 Issues raised in submissions

Powerlink stated that it was concerned about increases in the level of work effort forecast by PB in the last four years of the next regulatory period for land management activities. It did not consider that the amount allowed in the draft decision was sufficient to meet the increasing requirements associated with land management activities, including additional legislative imposts arising from koala habitat management.

EnergyAustralia stated that costs for contracted services, particularly those with high labour content such as vegetation management and pole inspection are increasing. It stated that contracts currently under review are expected to increase by 30 to 40 per cent compared with those negotiated 3–4 years ago, however, no further information was provided.

6.5.3 AER's considerations

The AER accepts that changing land management legislation involves both an up front cost of introducing new regimes and processes, and on going costs of maintaining compliance. Powerlink also faces additional legislative imposts arising from koala habitat management, beyond those considered at the time of the draft decision.

The AER considers that the escalation rates proposed in the draft decision more accurately reflect Powerlink's changing cost profile as a result of the amendments to the *Vegetation Management Act*, and other specific obligations identified in Powerlink's application. To accommodate these expected changes, the AER has allowed for a significant step increase in these costs from 2005–06. This step increase reduces throughout the next regulatory period, in recognition of the efficiencies that will result from improved land management practices, some of which PB discusses in its report.

Before the draft decision was made, Powerlink provided supplementary information identifying other potential land management obligations that could be imposed in the next regulatory period. The AER investigated these potential obligations, but there was insufficient evidence to confirm that their implementation would be likely in the next regulatory period or that the cost impact would require funds beyond those provided in the draft decision. As such, the AER has not provided a specific adjustment to the vegetation management escalation rate to cover these potential obligations. Similarly, the AER does not consider that the additional costs arising from koala habitat management have been shown to be significant enough to require a specific adjustment to the vegetation escalation rate.

In relation to EnergyAustralia's concerns about the increasing costs of labour intensive activities, such as vegetation management, these issues are addressed in section 6.2 on labour cost escalators.

The AER's conclusion regarding land management escalation factors is set out in table 6.2. The AER considers that the higher escalator for the years 2005–06 to 2007–08 better reflects the impact of actual legislative changes and future efficiencies than having a constant escalator throughout the next regulatory period.

Table 6.2 AER's conclusion on vegetation management cost escalators (%)

	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Powerlink[148]	2.5	2.5	2.5	2.5	2.5	2.5	2.5
PB	6.0	4.0	2.0	1.0	1.0	1.0	1.0
AER's conclusion	6.0	4.0	2.0	1.0	1.0	1.0	1.0

6.6 Self insurance

6.6.1 AER's draft decision

In the draft decision, the AER was satisfied that Finity Consulting Pty Ltd (Finity) had provided reasonable estimates of the costs of Powerlink's foreseeable risks. Those risks included:

- uninsurable risks—transmission structures and lines
- uninsured losses—'below deductible' claims on substations that are insured, but where Powerlink holds a material level of risk.

PB reviewed the methodology, source information and data used by Finity and considered the analysis to be reasonable.

The AER viewed a Powerlink Board resolution relating to self insurance that included the following risks:

- uninsurable losses—transmission structures and lines
- below deductible claims on insured items
- insurable losses on which premiums are considered uncommercial—machinery breakdown.

The AER considered that Powerlink's forecast self insurance costs were reasonable and that Powerlink had met the requirements of the SRP.

[148] As indicated earlier in this chapter, Powerlink forecast its opex requirements using 2004–05 as the base year, which was the latest year for which audited financial data was available at the time.

6.6.2 Issues raised in submissions

Powerlink stated that its revenue cap application did not include a self insurance allowance for risks associated with below deductible claims, instead it proposed a pass through arrangement for material deductibles. Powerlink noted that the new chapter 6A rules contain a materiality threshold of 1 per cent of the MAR, and as a result most deductibles claims will not be eligible for pass through. Therefore, Powerlink requested an increase in its self insurance allowance with the inclusion of an amount for below deductible claims, consistent with the estimate prepared by Finity.

Powerlink also stated that it had incorrectly de-escalated the self insurance allowance for machinery breakdown, which was derived from quoted premiums. The total amount for Powerlink's self insurance taking into account the uninsured losses forecast and the de-escalation correction is set out in table 6.3.

Table 6.3 Powerlink's revised self insurance forecast ($m 2006-07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink proposal	1.73	1.80	1.88	1.92	1.97	9.30

6.6.3 AER's considerations

The AER has reviewed Powerlink's revised self insurance forecast and its additional information. Given the changes to the pass through arrangements, the AER agrees that it is reasonable that Powerlink's self insurance allowance include an amount for below deductible claims on insured items. These amounts are no longer likely to be eligible for pass through. This amount was not included in the allowance set out in the draft decision and its inclusion has resulted in a slight increase in the allowance. The AER has also reviewed and accepted Powerlink's correction to the machinery breakdown component of the self insurance allowance.

The self insurance allowance provides for:

- uninsurable losses—transmission structures and lines
- below deductible claims on insured items
- insurable losses on which premiums are considered uncommercial—machinery breakdown.

After taking into account the information and advice from Powerlink, Finity and PB, the AER considers that Powerlink's self insurance allowance of $9.3 million for the next regulatory period is reasonable.

6.7 Gold Coast reinforcement—alternative capex efficiency claim

6.7.1 AER's draft decision

In the draft decision, the AER did not accept Powerlink's capex efficiency claim of $4.9 million per annum relating to the Gold Coast reinforcement project. The AER stated that, under the ACCC's 1999 *Draft statement of principles for the regulation of*

transmission revenues (DRP), to demonstrate that a management induced efficiency gain has occurred a TNSP must show that:

- capex in the regulatory period was below forecast levels
- capex savings have arisen and that these were the result of management induced actions.

The AER concluded that Powerlink had not demonstrated that the claimed savings were the result of capex that was below forecast levels during the current regulatory period or that its action resulted in an efficiency gain that was within its control. In regard to the latter point, the AER agreed with PB's finding that the early acquisition of easements was standard industry practice and therefore could not be attributed to a particular management efficiency or innovation.

6.7.2 Issues raised in submissions

The EUAA supported the AER's assessment of Powerlink's claimed capex efficiency in the draft decision.

Powerlink stated that it did not agree with the AER's conclusion on its Gold Coast reinforcement capex efficiency claim. It believed that its capex efficiency claim satisfied both parts of the DRP's test.

Powerlink also stated that if the AER is not convinced that its capex efficiency claim satisfies the DRP's requirements for a management induced efficiency, it should acknowledge that Powerlink's actions in proactively managing the easement have resulted in lower construction costs than would otherwise have occurred. It considered an alternative efficiency claim could be calculated, based on the difference in the cost of constructing the assets (excluding easement costs).

Powerlink calculated cost savings of $6.3 million based on the difference between the hypothetical construction costs and the actual costs of the project (exclusive of the easement acquisition costs). It proposed that these savings should be shared equally between it and customers. Further, it considered that the amount should be spread evenly during the next regulatory period as part of its opex allowance. Powerlink has therefore proposed an alternative efficiency allowance of $1.6 million ($2006–07) per annum.

6.7.3 AER's considerations

The AER confirms its decision not to allow Powerlink's alternative capex efficiency claim. Based on an assessment of the material submitted, the AER considers that Powerlink has not demonstrated that its alternative claim satisfies the DRP's requirements.

The DRP establishes benefit sharing provisions designed to provide incentives for the TNSP to maximise efficiency. Proposed Statement 7.2 in the DRP discusses the benefit sharing arrangements. In relation to capex it states:

> The TNSP is invited to demonstrate in its regulatory review application that any capital expenditure below forecast levels over the previous regulatory period has arisen because of management induced efficiency gains …
>
> … Where it is clearly demonstrated by the TNSP that capital expenditure shortfalls are the result of management efficiencies or innovation, the capital expenditure efficiency gains may be subject to glide path.[149]

The intention of the DRP's incentive framework is to reward TNSPs for achieving actual expenditures below the forecasts that were approved when setting the revenue cap. This framework provides TNSPs with an incentive to take measures to reduce their expenditure below the allowance that was set at the time of the revenue cap, if they can demonstrate that these measures relate to management induced efficiencies or innovation.

The AER notes that, under the DRP framework, a capex forecast is based on an assessment of the TNSP's expected investment and is used in the context of setting allowances for capex at the beginning of the regulatory period. Powerlink's alternative efficiency claim is based on comparing the construction cost estimates of a hypothetical project with the actual costs of constructing the project. The hypothetical project cost was estimated for Powerlink by a consultant.[150] The AER has reviewed the information regarding Powerlink's alternative efficiency claim and considers that the hypothetical forecast used does not satisfy the criterion set out in the DRP—that is, capex is below forecast levels. Powerlink has not demonstrated that capital savings have occurred in the context of capex being below forecast levels. The claim is based on a hypothetical project, which the AER considers is inconsistent with what a 'forecast' is—i.e. a forward looking estimate.

The AER considers that establishing a hypothetical forecast to assess whether a capital saving has occurred is contrary to the DRP's incentive framework. The intent of the DRP framework is to reward TNSPs for actual expenditure that is below the forecast determined when setting the revenue cap. A hypothetical project cost estimate, therefore, cannot be accepted as a relevant forecast to compare with actual expenditure.

Based on the AER's assessment that Powerlink has not demonstrated its capex was below forecast levels, it is unnecessary to consider whether Powerlink's claimed savings were the result of management induced efficiencies.

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149 ACCC, *Draft statement of principles for the regulation of transmission revenues*, 27 May 1999, p. 97.

150 The consultant identified the likely easement route and the associated construction costs in a 2005 environment.

6.8 Benchmarking

6.8.1 AER's draft decision

The AER's draft decision included a discussion on benchmarking measures, specifically the ITOMS study provided by Powerlink, and measures from the AER's transmission regulatory report.[151]

6.8.2 Issues raised in submissions

Transend expressed concern that benchmarking measures contained in the draft decision were used to support the AER's conclusions without factoring in specific circumstances facing each TNSP.

6.8.3 AER's considerations

The AER considers that benchmarking information discussed in the draft decision is relevant and informative. The various measures provide an indication of Powerlink's relative efficiency as a TNSP, both nationally and internationally. However, the AER recognises that specific circumstances can, and do, affect the results and comparability of benchmarking measures.

The AER did not rely on benchmarking measures to establish Powerlink's opex allowance, rather its decision was based on an explicit assessment of Powerlink's base year opex and specific cost drivers that affect Powerlink's future opex requirements.

6.9 Capitalisation profile

6.9.1 AER's draft decision

In the draft decision, the AER used an updated capitalisation profile as an input to Powerlink's opex model to account for the proposed asset growth based on the AER's adjustments to forecast capex.

6.9.2 AER's considerations

In chapters 3 and 4, the AER considered that several adjustments should be made to Powerlink's forecast capex. These adjustments have affected Powerlink's capitalisation profile for the next regulatory period adopted in the draft decision.[152] Table 6.4 shows the revised capitalisation profile.

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151 The International Transmission Operations & Maintenance Study (ITOMS) is a consortium of international transmission companies that work together with the UMS Group, comparing performance and practices and identifying best transmission industry practices worldwide. See www.umsgroup.com.

152 Following a request from the AER, Powerlink has provided updated capitalisation values for 2006–07 (forecast) and for the next regulatory period. The AER has applied the updated values to Powerlink's opex model. The capitalisation value for 2005–06 (actual) in the draft decision remains the same.

Table 6.4 Proposed asset capitalisation profile ($m, nominal)

	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Draft decision	186.05	229.64	539.17	441.10	377.14	389.44	515.40
Final decision	186.05	213.09	533.46	504.57	445.03	388.71	602.30

The adjusted capitalisation profile has been used as an input in Powerlink's opex model to account for the proposed asset growth during the next regulatory period. This adjustment ensures that Powerlink's allowed opex is consistent with its capitalisation profile.

6.10 AER's conclusion

The AER's conclusion is to provide an opex allowance of $731 million ($2006–07) for Powerlink during the next regulatory period. This equals an average annual opex allowance of $146 million, compared with Powerlink's proposed average annual opex of $157 million.

Table 6.5 shows the AER's and Powerlink's proposed total opex allowance. Table 6.6 sets out the impact of the AER's adjustments on Powerlink's controllable opex.

Table 6.5 AER's conclusion on Powerlink's opex allowance ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's controllable opex	113.11	119.48	126.52	135.61	140.12	634.85
Capex efficiencies	7.70	7.70	7.70	7.70	7.70	38.50
Debt management costs	4.89	4.20	4.28	4.40	3.79	21.56
Equity raising costs	2.47	2.47	2.47	2.47	2.47	12.35
Network support costs	24.03	17.34	22.15	8.22	8.30	80.04
Powerlink's total opex	152.20	151.19	163.12	158.40	162.38	787.30
AER's controllable opex allowance	112.50	119.44	124.73	131.79	135.84	624.31
Capex efficiencies	3.19	3.19	3.19	3.19	3.19	15.94
Debt raising costs[1]	1.77	2.03	2.26	2.38	2.52	10.96
Equity raising costs[2]	–	–	–	–	–	–
Network support costs[3]	24.03	17.34	22.15	8.22	8.30	80.04
AER's total opex allowance	141.49	142.00	152.33	145.58	149.85	731.25

[1] See section 5.2 for further discussion.
[2] An allowance for benchmark equity raising costs is included in Powerlink's RAB. See sections 5.4 and 5.5 for further discussion.
[3] The network support costs are forecasts. Network support costs may be subject to additional pass through during the next regulatory period.

Table 6.6 Adjustments to Powerlink's controllable opex ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's controllable opex	113.11	119.48	126.52	135.61	140.12	634.85
Adjustment to asset growth[1]	0.07	0.13	–0.08	–0.68	–0.62	–1.19
Adjustment to revised self insurance	0.47	0.52	0.58	0.62	0.66	2.86
Adjustments to condition based maintenance	–1.15	–1.78	–2.27	–2.65	–3.21	–11.05
Subtotal	112.49	118.36	124.76	132.91	136.95	625.47
Adjustments to labour, materials, vegetation management escalations[2]	0.00	1.09	–0.04	–1.11	–1.10	–1.16
AER's controllable opex allowance	112.50	119.44	124.73	131.79	135.84	624.31

[1] This adjustment reflects Powerlink's revised capitalisation profile.
[2] Includes updated actual CPI figures for 2005–06 and 2006–07.

7 Service standards

7.1 Introduction

The draft decision contained a service standards incentive scheme to apply to Powerlink for the next regulatory period. The scheme included six performance measures with associated financial incentives aimed at encouraging service improvements. Based on its own analysis, and advice from PB, the AER also established individual performance values (including target, cap and collar values, weightings, and measure definitions) as part of the scheme. The draft decision was based on the old rules and the *Service standards guidelines*, released on 12 November 2003 (guidelines).[153]

Table 7.1 shows the weightings and values established for Powerlink contained in the draft decision.

Table 7.1 Draft decision service standards incentive weightings and values

Measure	Unit	Weighting (%)	Max. penalty	Target	Max. bonus
Circuit availability—critical elements	%	15.5	97.92	99.12	99.71
Circuit availability—non-critical elements	%	8.5	98.19	98.52	98.85
Circuit availability—peak hours	%	15.5	97.93	98.29	98.65
Loss of supply > 0.2 system minutes	Number	15.5	7.5	5.0	2.5
Loss of supply > 1.0 system minutes	Number	30	2.9	0.9	0
Average outage duration (capped at 7 days)	Minutes	15	1520	939	358

The AER received submissions regarding the service standards incentive scheme contained in the draft decision. The key issues raised in submissions related to the revenue neutrality of targets, the period of historical averages, deadbands and the loss of supply event measures, exclusions and the nature of the service standards scheme applied to Powerlink.

This chapter sets out the AER's consideration of these issues and its conclusion on the service standards incentive scheme to apply to Powerlink for the next regulatory period.

7.2 Update of values in the AER's draft decision

7.2.1 Revised historical average

The AER based its draft decision on Powerlink's service standards performance information up to and including the 2005 calendar year. Since the release of the draft

[153] The 'old rules' refers to the rules that existed as at 3 April 2006.

decision, Powerlink has provided the AER with the service standards performance information for the 2006 calendar year. The AER has therefore calculated a revised historical average for each measure that includes Powerlink's 2006 performance results.

Table 7.2 sets out Powerlink's service standards performance results between 1996 and 2006. The table shows the historical average for each measure as set out in the draft decision and the revised historical average which includes the 2006 performance results.

Table 7.2 Powerlink's actual reliability performance

Measure		Circuit avail.— critical (%)	Circuit avail.— non-critical (%)	Circuit avail.— peak (%)	Loss of supply events > 0.2 system min.	Loss of supply events > 1.0 system min.	Average outage duration mins.
Actual performance	**1996–97**	–	–	–	2	0	970
	1997–98	–	–	–	4	0	2027
	1998–99	–	–	–	2	1	625
	1999–00	–	–	–	3	1	518
	2000–01	98.37	98.71	98.30	6	2	183
	2001–02	98.18	98.69	98.42	4[1]	2[1]	286
	2002[2]	99.80	98.70	98.70	9	3	743
	2003	98.50	98.70	98.60	8 (6)[3]	1	701
	2004	99.40	99.00	99.00	4	0	794
	2005	99.73	98.63	98.65	3	0	1517
	2006	99.12	98.18	98.12	3	1	1410
Average	**1996–2005**	–	–	–	4.6 (4.3)[3]	0.9	–
	2002–2005	99.36	98.76	98.74	–	–	939
Revised average	**1996–2006**	–	–	–	4.4 (4.2)[3]	0.9	–
	2002–2006	99.31	98.64	98.61	–	–	1033
	Adjustment from draft decision	–0.05	–0.12	–0.13	–0.2 (–0.1)[3]	0	95

Note: Shading indicates that Powerlink has low confidence in the data. These values have been omitted from average results.

[1] Averages omit performance data from 2001–02 financial year, effectively omitting July to December 2001 from the average.

[2] Performance data from 2002 is on a calendar year basis in accordance with the *Service standards guidelines.*

[3] Figures in brackets have been adjusted to align with the exclusion requirements of the *Service standards guidelines.*

7.2.2 Revised performance values

The AER aims to establish performance values within the service standards scheme which are based on the most recent and reliable data. As such, it has revised the historical average for each measure and adjusted the performance values contained in the draft decision, including target, cap and collar values, to account for Powerlink's 2006 performance information.

In revising these performance values the AER has applied the same methods as those used in the draft decision. The revised targets are based on the revised historical average, including any adjustments for forecast changes to performance in the next regulatory period. These adjustments include the allowance made for the connection of new capital works as outlined in the draft decision. Cap and collar values have also been set in line with the methodology contained in the draft decision. Further explanation of the methodology for setting these cap and collar values is set out in section 7.8.

Table 7.3 contains the revised performance values that the AER will apply to Powerlink subject to the considerations in the following sections of this chapter.

Table 7.3 AER's service standards incentive values revised for 2006 performance

Measure	Historical average (incl. 2006)	Adjustments	Target (with adjustments)	Max. penalty (collar)	Max. bonus (cap)
Circuit availability—critical elements (%)	99.31	–0.24	99.07	98.01	99.60
Circuit availability—non-critical elements (%)	98.64	–0.24	98.40	97.81	98.99
Circuit availability—peak hours (%)	98.61	–0.45	98.16	97.53	98.80
Loss of supply > 0.2 system minutes (%)	4.20	0.67	4.87	7.37	2.37
Loss of supply > 1.0 system minutes (%)	0.90	–	0.90	2.89	0.0
Average outage duration (capped at 7 days) (minutes)	1033	–	1033	1627	439

7.2.3 Consideration of submissions

The revisions outlined in table 7.3 result in different performance values to be applied to Powerlink compared with those contained in the draft decision, on which stakeholders have based their submissions. Where these submissions have relied on the values set out in the draft decision, the AER has addressed the underlying principles or concerns raised in those submissions in light of the expanded data set and revised historical averages.

7.3 Revenue neutral targets

7.3.1 AER's draft decision

In the draft decision, the AER set a target for critical circuit availability of 99.12 per cent and collar and cap values of 97.92 and 99.71 respectively. The target was based on Powerlink's historical average result between 2002 and 2005. It also included an adjustment of 0.24 per cent, for an expected decrease in performance during the next regulatory period due to the commissioning of an increasing number of new capital works.

The established target was considered to result in a revenue neutral outcome, with Powerlink receiving no bonus or penalty when there was no underlying change in its historical average performance.

7.3.2 Issues raised in submissions

In its response to the draft decision, Powerlink stated that the historical average on which the target for critical circuit availability in the draft decision was based was not revenue neutral. It considered that the target should be lowered to ensure that there is an equal probability of receiving a bonus or penalty.[154] Powerlink proposed a final target of 99.02, which took into account an adjustment for new capital works.

Powerlink provided a statistical report from the Queensland University of Technology (QUT) to support its claim. The QUT stated that if a normal distribution is assumed to apply to the critical circuit availability measure, resulting in a theoretical distribution of best fit, 13.62 per cent of the upper tail distribution would exceed 100 per cent availability. It considered that it was impossible to achieve greater than 100 per cent availability for the measure and that this increases the probability of receiving a penalty above that of receiving a bonus. As such, the QUT considered that 'the current target value setting is not neutral' and that the target value should be lowered by 0.10 per cent.[155] The QUT report was attached as appendix F to Powerlink's submission on the draft decision.

Table 7.4 outlines Powerlink's proposed adjustments to the critical circuit availability measure.

Table 7.4 Powerlink's proposed target adjustment—critical circuit availability

Measure	Average for 2002–05 (%)	Neutrality adjustment (%)	Adjustment for new works (%)	Proposed target (%)
Circuit availability—critical	99.36	−0.10	−0.24	99.02

154 Powerlink, *Response to AER draft decision*, February 2007, p. 49.

155 QUT, *Proposed change to service standard sub-measure 1a transmission circuit availability—critical elements: A brief report for Powerlink Queensland*, February 2007, p. 3.

7.3.3 AER's considerations

The AER has reviewed Powerlink's submission and its supporting information regarding the revenue neutrality of the historical average for critical circuit availability. The AER notes that the submission is focussed on the neutrality of the historical average, rather than the target, set out in the draft decision. The target includes an adjustment for the connection of new works of 0.24 per cent.

The QUT's report is based on the assumption that a normal distribution can best describe the distribution of the critical circuit availability measure. The report uses this assumption to conclude that the actual probability of receiving a bonus is lower than the probability of receiving a penalty and proposes to adjust the target by 0.1 per cent away from the long-term average, to equalise these probabilities.

When analysing the QUT's report, the AER obtained advice from PB and sought to assess whether:

- The QUT analysis of the critical circuit availability measure and its related assumptions are appropriate and materially support an adjustment to the targets
- the adjustment proposed by the QUT appropriately addresses the issue raised by Powerlink.

The analysis relied on by the QUT is based on theoretical assumptions regarding the critical circuit availability. The primary assumption of the report is that the distribution, which describes the measure, is normal. The QUT provides no information to support this assumption. In its advice, PB highlighted this assumption as being problematic due to the limited evidence and discussion of this assumption, including addressing the issue of applying an unbounded distribution to a bounded variable.

The AER has supplemented the QUT analysis with an empirical review of Powerlink's historical performance data. This performance is set out in table 7.5. The AER does not consider that the four years of data available to the QUT at the time of its analysis provides further and sufficient evidence to support its theoretical assumptions. As such, the AER considers that the distribution assumed by the QUT is not exact, but is at best an approximation of the distribution of the measure.

Given the approximate nature of the distribution assumed by the QUT, and in the absence of additional supporting information, the AER does not consider that the QUT analysis of the measure and its related assumptions are a sufficient basis on which to make conclusions regarding the neutrality of the historical average or any adjustments thereafter. Further, given the approximate nature of the analysis, the AER does not consider that the QUT has demonstrated that the proposed outcome is materially different from the AER's conclusion, or that the AER should depart from using a TNSP's historical average performance as the basis of its performance targets.

Table 7.5 Historical performance—critical circuit availability 2002–05 (%)

Measure	2002	2003	2004	2005	Average
Circuit availability—critical elements	99.80	98.50	99.40	99.73	99.36

The AER also considered the solution proposed in the QUT's report in response to the issue of target neutrality. Based on advice from PB, the AER considers that in proposing an adjustment to the target, the QUT has not used an appropriate methodology. PB noted in its advice that the QUT based its proposed adjustment—to equalise the probabilities of receiving a bonus and penalty—on a normal distribution in which the upper tail is cut off. PB considered this approach to be incorrect and that analysis of the probabilities can only be undertaken once the distribution has been 're-normalised' so that the integration of the distribution is equal to 100 per cent. Further, PB stated that if the distribution is re-normalised as required, this would result in no change to the mean value. On this basis, PB recommended that the QUT's adjustment is not likely to result in the probability of a reward being equal to that of a penalty.

In light of these considerations, the AER does not consider that the QUT's report provides sufficient evidence to support Powerlink's proposal to adjust the target for the critical circuit availability measure. As such, the revised target for critical circuit availability will apply to Powerlink in the next regulatory period, without further adjustment.

7.4 Period of historical average

7.4.1 AER's draft decision

The draft decision set out performance targets for the loss of supply event measures based on average data between 1996 and 2005. In contrast, the targets for circuit availability and average outage duration measures were set on average data between 2002 and 2005.

The AER sets targets on what it considers to be the most recent and reliable information available.[156] While recent and reliable information was available for the loss of supply event measures before 2002, the AER did not include data prior to 2002 for the other measures because Powerlink had indicated that the data for the remaining measures was unreliable. As such, the AER did not consider this information to be an appropriate indicator of Powerlink's future performance for these measures.

7.4.2 Issues raised in submissions

Powerlink stated that performance targets should be set over a consistent number of years and that the loss of supply event measure targets should be based on the most recent and common period of data as used for the other measures—i.e. the loss of supply event measures should be based on performance data between 2002 and 2005.

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156 AER, *Powerlink Queensland transmission network revenue cap 2007–08 to 2011–12—Draft decision*, 8 December 2006, p. 158.

Powerlink noted that the historical averages applying to the loss of supply event measures were set over a longer period than those used for the circuit availability and average outage duration measures. It claimed that these periods should be consistent and that the AER's approach in its draft decision was not consistent with the five year averaging period applied in the *First proposed service target performance incentive scheme*.[157] It also claimed that averaging over a longer period was not appropriate because performance before 2002 was not relevant to the operating environment faced by Powerlink and the aims of the scheme.

7.4.3 AER's considerations

The AER is assessing Powerlink's revenue cap application under the old rules and the SRP, which includes the service standards guidelines. This is required by the Powerlink transitional provisions contained in clause 11.6.12 of the new chapter 6A rules. Therefore, the AER does not consider it appropriate to apply substantive elements of the *First proposed service target performance incentive scheme*, formulated in accordance with clause 6A.7.4 of the new rules, in this decision.

The current service standards guidelines state that the AER will use the actual performance outcomes of each Australian TNSP from the last three to five years as a guide to set achievable performance targets.[158] The AER considers that the timeframe indicated in the guidelines is the preferred minimum rather than the maximum range of data required to set targets under the guidelines. The guidelines state that:

> …the best guide to future outcomes can be derived from past performance. A TNSP's most recent performance would take into account all available historical information, making it a reliable method of setting achievable targets.[159]

Based on the guidelines, the AER considers that the loss of supply event measure targets were appropriately set using the most recent and reliable historical data available, namely continuous performance data between 1996 and 2005. These targets have since been adjusted to include 2006 performance data. Further, the AER does not consider that Powerlink has sufficiently shown that data before 2002 is not relevant when applying a target to its future performance in this, its first service standards scheme.

The AER also does not agree that the historical average used to set a performance target must be set over a consistent period across performance measures. This is particularly the case when establishing a service standards scheme for a TNSP where the range of recent and reliable historical data available may vary between TNSPs and performance measures. Therefore, the AER recognises that it may not always be appropriate to apply historical averages across a consistent period.

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157 AER, *First proposed service target performance incentive scheme*, 31 January 2007.

158 ACCC, *Service standards guidelines—Decision*, 12 November 2003, p. 5.

159 ibid., p. 5.

7.5 Loss of supply event targets

7.5.1 AER's draft decision

In the draft decision, the AER determined targets for each performance measure based on unrounded historical average performance and used single data points for all measures. Following advice from PB, the AER adopted the use of single data points rather than deadbands. PB recommended this approach because it maintained the 'sharpness' of the measure and did not smear the targets, and therefore did not impact upon a TNSP's incentives. The AER noted, however, that this method would be applied on a case-by-case basis.

7.5.2 Issues raised in submissions

Powerlink stated that the loss of supply event measures should be rounded to the nearest whole number because in any one year only whole number of events can occur. It proposed that a deadband should be applied to the loss of supply event measures greater than a 0.2 system minute between six and seven events. Powerlink claimed that applying this deadband produced a fair outcome for this measure.[160] This view was supported by Transend, which stated that deadbands limit 'natural variability of performance as a result of random events that are beyond the control of the company'.[161]

7.5.3 AER's considerations

The AER notes concerns expressed in the Powerlink submission about applying values for loss of supply event measures that are not rounded to the nearest event. After considering these concerns, the AER will round the targets for these measures to the nearest whole number, which will result in a minor softening of the loss of supply event targets. The AER considers this is a minor but appropriate adjustment that recognises the achievable outcomes for these measures in any one year. The AER does not consider that rounding to the nearest whole number will substantially impact upon the incentives provided to Powerlink and will maintain robust performance targets.

Based on the revised performance values outlined in table 7.3, the AER has adjusted the revised target for loss of supply events greater than 0.2 system minute from 4.87 to five events. The cap and collar values have also been rounded to the nearest whole number within two standard deviations of the revised target—i.e. to two and eight events respectively.[162] The AER has also adjusted the target for loss of supply events greater than 1.0 system minute from 0.9 event to one event, and the related collar value to three events. These changes are shown in table 7.6.

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160 Powerlink, *Response to AER draft decision*, 9 February 2007, p. 50.

161 Transend, *Submission to the AER in response to Powerlink draft decision*, 7 February 2007, pp. 7-9.

162 PB had recommended that cap and collar values be set at 2.5 events or approximately 1.5 standard deviations from the target for loss of supply events greater than 0.2 system minute. The AER has not adopted PB's recommendation for this decision. Instead, the AER has used whole values for the loss of supply events, and has set cap and collars values two standard deviations from the relevant target.

Table 7.6 AER's conclusion on values—loss of supply events

Measure	Collar	Target	Cap
Loss of supply events > 0.2 system minutes	8.0	5.0	2.0
Loss of supply events > 1.0 system minutes	3.0	1.0	0.0

Powerlink also proposed that the AER apply a deadband to the loss of supply measures for events greater than 0.2 system minute. Based on PB's advice, the AER does not consider it appropriate to apply a deadband to this measure. The AER recognises that deadbands can be useful in offsetting downside risk in a volatile or highly variable data set. However, deadbands not only reduce the risk, but also contain the impact and the effect of performance incentives. While they offset small downside risks for a TNSP, they can also discourage TNSPs to make small improvements above the target. The AER considers that the current targets do not place excessive risk on Powerlink and therefore has not applied a deadband for this measure.

7.6 Exclusions

7.6.1 AER's draft decision

In the draft decision, the AER accepted PB's recommendation to exclude two loss of supply events from Powerlink's historical data as they were outside of the control of Powerlink. This was to assist in setting targets based on consistent and repeatable performance. These exclusions were consistent with the exclusion definitions of the guidelines and set out in appendix F of the draft decision.

7.6.2 Issues raised in submissions

Powerlink disagreed with the exclusion of the two loss of supply events from its performance history in establishing its performance targets. It stated that these were excluded by PB under the force majeure and third party outage definitions in the guidelines. Powerlink claimed that these events, including a thunderstorm and protection system malfunction, were not extraordinary events and were correctly included in its performance history.[163]

Powerlink contended that exclusions under the guidelines may be applied differently to each performance measure, based on the underlying intention of the measure. In the case of loss of supply events, Powerlink stated that the issue was whether it had fulfilled its obligation to supply load and disagrees that ownership of the affected asset or the extraordinary nature of the event should be considered.

7.6.3 AER's considerations

The AER considers that the two loss of supply events should not be included in Powerlink's performance data. It agrees with PB's conclusion that the exclusion definitions should be applied where outages meet the definition and should not be based on the perceived intention of the measure.

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[163] Powerlink, *Response to AER draft decision*, 9 February 2007, p. 50.

The guidelines clearly intend that TNSPs should not be subject to risks that are 'beyond the reasonable control of the TNSP'.[164] As such, it includes force majeure and third party events as exclusions for relevant measures to mitigate uncontrollable risks faced by TNSPs. In the case of the two loss of supply events recommended by PB for exclusion, these events were considered to be outside of the TNSP's operational influence and therefore within the definitions contained in the guidelines and applied to Powerlink.

The lightning event on February 2003 resulted in a double circuit outage. While a lightning event per se is not extraordinary, the impact of the event was unusual and extraordinary thus resulting in a force majeure event. Similarly, the March 2003 event, resulting from a protection system malfunction, caused an inter-trip signal to be sent to Energex's substation. While load was lost on the distribution network, the AER considers it inappropriate that third party assets, outside the control of the TNSP, should be included in service standards calculations. As such, the AER will exclude these events when calculating the historical average for the loss of supply event measures and, for consistency, will exclude similar events in the next regulatory period.

7.7 Nature of the service standards scheme

7.7.1 AER's draft decision

In the draft decision, the AER established a service standards incentive scheme, based on the service standards guidelines, to apply to Powerlink based on the service standards guidelines. It included three network performance measures that were divided into six sub-measures. Further, it required Powerlink to report its performance against the measures.

7.7.2 Issues raised in submissions

QAL stated that the service standards incentive scheme applying to Powerlink should have a greater customer focus. It recommended that the scheme: impose minimum standards of network security; improve the availability of outage information to customers; and compensate customers affected by outages in the Powerlink network.

7.7.3 AER's considerations

The AER considers that QAL raises some important issues relevant to the debate on the service standards incentives scheme to apply to all TNSPs. However, the elements proposed by QAL are presently not part of the service standards guidelines that set out the AER's service standards incentive framework.

These service standards guidelines were established in 2003 based on advice from Sinclair Knight Merz and following extensive public consultation. The guidelines set out three core network-based performance measures—circuit availability, loss of supply event frequency and average outage duration. These network performance measures were formulated to provide incentives for TNSPs to improve the average performance of the network by affecting their operational behaviour.

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164 ACCC, *Service standards guidelines—Decision*, 12 November 2003, p. 9.

The guidelines neither set minimum standards nor focus on individual customer outcomes. However, the guidelines require TNSPs to report service performance information annually about these measures, including certain outage information, and Powerlink will be required to comply with these reporting requirements during the next regulatory period. The guidelines also do not provide a mechanism for compensation of customers affected by outages.

The AER does not believe that consideration of the substantive policy issues raised by QAL is appropriate in the context of this decision. Therefore, the AER has applied the guidelines in setting Powerlink's service standards incentive scheme. The AER would, however, welcome submissions by QAL in any future review of the service standards incentive scheme.

7.8 Cap and collar values

7.8.1 AER's draft decision

In the draft decision, the AER established cap and collar values in accordance with PB's recommendations. Based on PB's advice the AER set most cap and collar values two standards deviations from the measure target to allow for natural fluctuations in a measure. However, consistent with PB's advice, the AER set some cap and collar values below two standard deviations from the target. The following performance measure cap and/or collar values were set below two standard deviations from the target:

- critical circuit availability cap (one standard deviation)
- loss of supply events greater than 0.2 system minute cap and collar (2.5 events from the target or approximately 1.5 standard deviations)
- loss of supply events greater than 1 system minute cap (one standard deviation)
- average outage duration cap and collar (1.5 standard deviations).

7.8.2 Issues raised in submissions

Powerlink stated that PB did not consistently set caps and collars at two standard deviations from targets. It therefore proposed cap and collar values that were two standard deviations from the targets proposed in its submission on the draft decision.

7.8.3 AER's considerations

The AER does not agree that PB inconsistently applied a methodology for setting cap and collar values. In its advice, PB stated that 'the cap and collar values should ideally be about two standard deviations of the historical data'. However, PB also explained that there should be exceptions to this 'rule of thumb' where the cap or collar values were approaching the maximum performance possible or where the incentives of the measure would be unduly affected. The AER considers that the reasons provided by PB about why some cap or collar values should not be two standard deviations are sound. The AER therefore has not set all cap and collar values two standard deviations from performance targets.

7.9 Impact of future capex on performance

Following the draft decision, the AER sought advice from PB regarding the impact of the increased capex program on Powerlink's service standards performance. PB responded by noting that the capex program could potentially affect service performance for the relevant measures, but that the recently commissioned works were unlikely to result in a significant change in Powerlink's performance indicators.

PB stated that the works proposed by Powerlink were justified under the reliability limb of the regulatory test and were required to meet expected increases in electricity demand over the next regulatory period. PB highlighted that 'these works were not intended to improve reliability or security of supply over and above the required levels'. As such, PB expected that overall service performance should remain the same or be immaterial when compared to the effect of outages for new works. PB recommended no specific adjustment for these works.

The AER accepts PB's advice on this matter and proposes no other adjustments to the performance targets, and considers them to be robust and reflective of Powerlink's expected performance.

7.10 Other amendments

In appendix F of the draft decision, the AER stated that Powerlink should submit a performance report on an annual basis. This performance report should be in accordance with the information requirements as outlined in the guidelines.[165] The AER has since formulated supplementary information requirements for annual performance reporting. Section D.5 of appendix D sets out these supplementary information requirements.

The AER requires Powerlink to submit its annual performance report in line with the AER's supplementary information requirements.

7.11 AER's conclusion

The AER has made some adjustments to the service standards incentive scheme contained in the draft decision and has set revised values to apply to Powerlink in the next regulatory period. These adjustments include:

- revising the performance target, cap and collar values to account for 2006 performance information
- rounding the target values for loss of supply greater than 0.2 system minutes and loss of supply greater than 1 system minute to the nearest whole number—i.e. to five and one events respectively. Cap and collar values for these measures have also been adjusted.

The revised values to apply to Powerlink are set out in table 7.7.

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165 AER, *Powerlink Queensland transmission network revenue cap 2007–08 to 2011–12—Draft decision*, 8 December 2006, p. 209.

The AER has also included appendix D, which outlines the final formulae, graphs and information requirement to apply to Powerlink in the next regulatory period. Appendix D replaces appendix F in the draft decision.

Table 7.7 AER's conclusion on service standards incentive weightings and values

Measure	Unit	Weighting (%)	Max. penalty (collar)	Target	Max. bonus (cap)
Circuit availability—critical elements	%	15.5	98.01	99.07	99.60
Circuit availability—non-critical elements	%	8.5	97.81	98.40	98.99
Circuit availability—peak hours	%	15.5	97.53	98.16	98.80
Loss of supply > 0.2 system minutes	Number	15.5	8.0	5.0	2.0
Loss of supply > 1.0 system minutes	Number	30.0	3.0	1.0	0.0
Average outage duration (capped at 7 days)	Minutes	15.0	1627	1033	439

8 Maximum allowed revenue

8.1 Introduction

As an economic regulator, the AER determines the maximum allowed revenue (MAR) of a transmission network service provider (TNSP) in accordance with the building block approach. In the draft decision, the AER determined a nominal smoothed revenue allowance for Powerlink that increases from $536 million in 2007–08 to $736 million in 2011–12. This chapter sets out the AER's calculation of Powerlink's MAR for the next regulatory period based on the revised building block components allowed in this final decision. It also sets out the AER's consideration of an issue raised by interested parties regarding the regulatory accounting methodology used for recognising Powerlink's forecast capex.

8.2 Regulatory accounting methodology for recognising capex

8.2.1 AER's draft decision

In the draft decision, the AER applied the hybrid approach as the regulatory accounting methodology for recognising capex. This approach provides the return on capital under an as-incurred basis and the return of capital on an as-commissioned basis.

8.2.2 Issues raised in submissions

Powerlink noted that the use of the hybrid approach in the draft decision lessens the price impact of the regulatory accounting change, compared with the full as-incurred approach, by a small amount. It contended that, because of prevailing circumstances (high demand growth and high input costs), the AER should either abandon it in its entirety or defer the regulatory accounting change to the next period (2012–17). The EUAA supported the as-commissioned approach for recognising capex.

The Queensland Department of Mines and Energy (DOME) stated that the proposed approach to recognising capex would advance costs to customers but would not deliver any benefits to them. DOME also suggested that the AER might be restricting the forecast capex allowance for Powerlink to compensate for price rises associated with the change in approach for recognising capex.

Transend noted that the principle of consistency with accounting standards lends support to the hybrid approach and that it would be appropriate to give other TNSPs the option of adopting this approach.

8.2.3 AER's considerations

The AER has maintained its position in the draft decision of adopting the hybrid approach for recognising capex. Under the ex ante capex framework, the hybrid approach provides stronger efficiency incentives than the as-commissioned approach because it allows the return on capital associated with assets under construction to form part of the incentive when capex targets are established. This is consistent with the National Electricity Law objective of promoting efficient investment for the long-term interests of consumers.

While Transend noted that the hybrid approach is consistent with Australian accounting standards, the AER considers that it is also consistent with the requirements of the new chapter 6A rules. The hybrid approach also better aligns the timing of cash flows with a TNSP's construction of capital works and simplifies the arrangements for calculating the cost of finance during construction.

The AER refutes the suggestion that Powerlink's capex was reduced because of potential pricing pressures relating to the change in the regulatory accounting methodology. It based its assessment on a thorough review of the efficiency and appropriateness of Powerlink's capex proposal. Accordingly, no such links should be made between the AER's consideration of the regulatory accounting methodology and its assessment of forecast capex.

The AER is aware that moving from an as-commissioned approach to the hybrid approach advances the recognition of capex and consequently results in a cost (pricing) impact to customers. It should be noted, however, in present value terms the change in the timing of costs does not result in any adverse financial impact on customers overall or the service provider over the life of the asset. In addition, based on the capex allowance in this decision, the AER's revenue modelling indicates that the change in the regulatory accounting methodologyw will not materially affect the average end user prices (see section 8.5).

8.3 AER's assessment of building blocks

The MAR for each year of the regulatory period is determined in accordance with the accrual building block approach:

Revenue	=	return on capital + return of capital + opex + tax
	=	(WACC × WDV) + D + opex + tax

where:

WACC	=	the weighted average cost of capital
WDV	=	the written-down (depreciated) value of the asset base
D	=	depreciation
opex	=	operating and maintenance expenditure
tax	=	the expected business income tax payable.

The revenue allowance can be lumpy over the regulatory period. To minimise price shocks, the revenues are smoothed within a regulatory period while maintaining the principle of cost recovery under the building block approach. Smoothing requires diverting some of the cost recovery to adjacent years within the regulatory period so that the net present value (NPV) of the smoothed revenues is equal to the NPV of the unsmoothed revenue stream. That is, a smoothed profile of the TNSP's allowed revenue (AR) is determined for the regulatory period under the CPI – X mechanism.

The MAR for the first year is set equivalent to the AR for the first year of the revenue cap:

$$MAR_1 = AR_1$$

where:

MAR_1 = the maximum allowed revenue for year 1

AR_1 = the allowed revenue for year 1.

The MAR for the subsequent year of the regulatory period requires an annual adjustment based on the previous year's AR. That is, the subsequent year's AR is determined by adjusting the previous year's AR for actual inflation and the X factor:

$$AR_t = AR_{t-1} \times (1 + \Delta CPI) \times (1 - X)$$

where:

AR = the allowed revenue

t = time period/financial year (for $t = 2, 3, 4, 5$)

ΔCPI = the annual percentage change in the Consumer Price Index All Groups, Weighted Average of Eight Capital Cities from march in year $t - 2$ to March in year $t - 1$

X = the smoothing factor.

The MAR is determined annually by adding to (or deducting from) the allowed revenue, the service standards incentive (or penalty) and any approved pass through amounts (see table 8.1 for timing of calculating the AR and financial incentive):

MAR_t = (allowed revenue) + (financial incentive) + (pass through)

$$= AR_t + \left(\frac{(AR_{t-1} + AR_{t-2})}{2} \times S_{ct} \right) + P_t$$

where:

MAR = the maximum allowed revenue

AR = the allowed revenue

S = the service standards factor determined in accordance with the performance incentive scheme set out in chapter 7 and appendix D of this final decision

P = the pass-through amount that the AER has determined in accordance with the pass-through mechanisms set out in section 6.6.11 and chapter 8 of the draft decision

t = time period/financial year (for $t = 2, 3, 4, 5$)

ct = time period/calendar year (for $ct = 2, 3, 4, 5$).

Table 8.1 Timing of the calculation of allowed revenues and the financial incentive

t	Allowed revenue (financial year)	*ct*	Financial incentive (calendar year)
-	1 July 2007–30 June 2008	-	Not applicable
2	1 July 2008–30 June 2009	2	1 July 2007–31 December 2007[1]
3	1 July 2009–30 June 2010	3	1 January 2008–31 December 2008
4	1 July 2010–30 June 2011	4	1 January 2009–31 December 2009
5	1 July 2011–30 June 2012	5	1 January 2010–31 December 2010

[1] The AER's service standards scheme for Powerlink applies from the start of the next regulatory period (1 July 2007). Therefore, the financial incentive calculation will be based on the number of days remaining after 1 July 2007 in the calendar year (i.e. half a calendar year).

8.3.1 Opening asset base and roll forward

The basic method underlying the roll forward of Powerlink's asset base over the next regulatory period is that the closing value of the asset base from year to year is constructed by taking the opening value, converting it to a nominal figure by adding an inflation adjustment, adding any capex and subtracting disposals and depreciation for the year. The closing value for one year's asset base then becomes the opening value for the following year's asset base.

As explained in chapter 2, the AER has determined the opening value of Powerlink's regulated asset base (RAB) to be $3753 million as at 1 July 2007. The AER has modelled Powerlink's asset base over the next regulatory period as shown in table 8.2. The AER's modelling indicates that Powerlink's RAB increases by 73 per cent over the next regulatory period.

Table 8.2 AER's roll forward of Powerlink's regulated asset base ($m, nominal)

	2007–08	2008–09	2009–10	2010–11	2011–12
Opening asset base	3752.83	4455.14	5107.90	5541.94	6045.69
Capital expenditure	742.09	698.96	475.21	549.34	482.84
Return of capital	–39.78	–46.19	–41.17	–45.60	–44.95
Closing asset value	4455.14	5107.90	5541.94	6045.69	6483.58

8.3.2 Forecast capital expenditure

As explained in chapter 4, the AER has provided Powerlink with a forecast capex allowance of $2629 million ($2006–07) for the next regulatory period. The annual allowance ($nominal) is shown in table 8.2 and is used to calculate the roll forward value of Powerlink's RAB.

8.3.3 Depreciation

Using a post-tax nominal framework, the AER has made allowances for nominal (economic) depreciation. Economic depreciation adds the (negative) straight-line depreciation with the (positive) annual inflation effect on the asset base. Economic depreciation was used to model the nominal asset values over the regulatory period and

to determine the depreciation allowance. In modelling the applicable straight-line depreciation component for Powerlink, the AER based its calculation on the remaining life (for existing assets) and standard life (for new assets) per asset class. Table 8.2 shows the resulting figures (referred to as the return of capital).

8.3.4 Weighted average cost of capital

To establish the appropriate return on capital as shown in table 8.3, the AER multiplied Powerlink's opening RAB (over the length of the regulatory period) by the WACC estimated in chapter 5 of this decision.

The AER's nominal vanilla WACC of 8.76 per cent is based on a post-tax nominal return on equity of 11.68 per cent and a pre-tax nominal cost of debt of 6.82 per cent.

8.3.5 Operating and maintenance expenditure

As discussed in chapter 6, the AER has provided Powerlink with an opex allowance of $731 million ($2006–07) during the next regulatory period. Table 8.3 shows the annual allowance, which equates to an average amount of $163 million per annum in nominal terms.

8.3.6 Estimated taxes payable

Tax estimates relate to Powerlink's regulated activities only. The AER has modelled Powerlink's income tax payable during the next regulatory period, based on its tax depreciation/expense profile. The AER's assessment of taxes payable are based on the 60 per cent gearing assumed in the WACC framework, rather than Powerlink's actual gearing position. Table 8.3 shows the AER's estimate of Powerlink's tax payments.

8.4 Decision—maximum allowed revenue

Based on its assessment of the building block components and using the post–tax revenue model, the AER has determined a nominal unsmoothed revenue allowance for Powerlink that increases from $537 million in 2007–08 to $778 million in 2011–12 (see table 8.3).[166]

The increase in revenues during the next regulatory period is mainly due to:

- the requirement for increased investment associated with higher levels of forecast demand and the need to replace ageing assets in order to maintain a reliable electricity supply. The AER also considers that there is evidence that Powerlink's current projects under construction have been impacted by higher input costs such as labour and base metals for construction materials (as a consequence of the commodity/minerals boom)

[166] This revenue allowance includes the AER's conclusion on Powerlink's supplementary revenue cap proposal. Therefore, it is not comparable to Powerlink's original revenue request of $540 million in 2007–08 increasing to $751 million in 2011–12.

- increased opex associated with high labour costs, a growing asset base, and increasing legislative requirements (e.g. vegetation management) and grid support costs.

Table 8.3 AER's decision on unsmoothed revenues ($m, nominal)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Return on capital	328.90	390.45	447.66	485.70	529.84	2182.54
Return of capital	39.78	46.19	41.17	45.60	44.95	217.69
Operational expenditure	147.63	156.76	169.18	166.99	177.30	817.86
Net taxes payable	20.50	22.64	22.53	24.01	26.25	115.93
Unsmoothed revenue	536.81	616.04	680.54	722.29	778.34	3334.01

The NPV of unsmoothed revenue for the next regulatory period has been calculated to be $2571 million. Based on this NPV amount, the AER has determined a nominal smoothed allowed revenue for Powerlink that will increase from $537 million in 2007–08 to $815 million in 2011–12, as shown in table 8.4 (based on a smoothing X factor of –7.60 per cent). Powerlink's allowed revenue during the next regulatory period is calculated based on the formula described in section 8.3.

Table 8.4 AER's decision on smoothed allowed revenue ($m, nominal)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Smoothed allowed revenue	536.81	595.79	661.26	733.91	814.55	3342.32

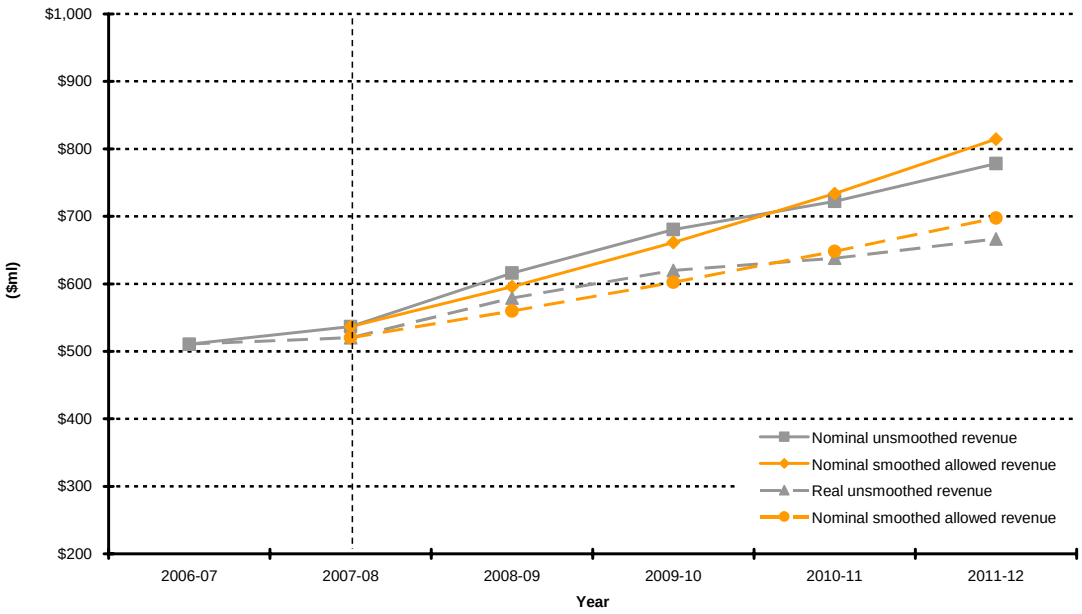
As stated in section 8.3, the AER smooths a TNSP's revenue allowance within a regulatory period in order to minimise price shocks that may result from a lumpy revenue profile. The smoothed revenue increase during the next regulatory period consists of:

- an initial increase of 5.1 per cent (nominal) from 2006–07 to 2007–08
- a subsequent average annual increase of 11 per cent (nominal) during the remainder of the next regulatory period.

In real terms, the revenue increase during the next regulatory period consists of an initial increase of 1.9 per cent from 2006–07 to 2007–08 and a subsequent average annual increase of 7.6 per cent during the remainder of the next regulatory period.

Figure 8.1 shows the revenue path allowed by this decision (both smoothed and unsmoothed) in nominal and real terms.

Figure 8.1 Revenue path from 2006–07 to 2011–12 ($m)



In reaching its final decision, the AER considers that the smoothed allowed revenue it has provided for Powerlink is consistent with the rules, in that it provides a fair and reasonable risk-adjusted cash flow rate of return on efficient investment. The decision also provides an acceptable balancing of the interests of a TNSP and users in accordance with the objectives of the rules.

8.5 Transmission charges

Powerlink determines its transmission charges based on the AER's allowed revenues and the pricing principles contained in the rules. The effect of the AER's decision on average transmission charges can be estimated by taking the allowed revenues and dividing them by forecast energy delivered in Queensland. Based on this approach, the AER estimates that this decision will result in an average increase of around 6 per cent per annum (nominal) in transmission charges over the next regulatory period.[167] The increases in average transmission charges are less than the increases in revenues (section 8.4) because of increases to forecast energy delivered. In real terms, the AER estimates that this decision will result in an average increase of around 2.8 per cent per annum in transmission charges over the next regulatory period.

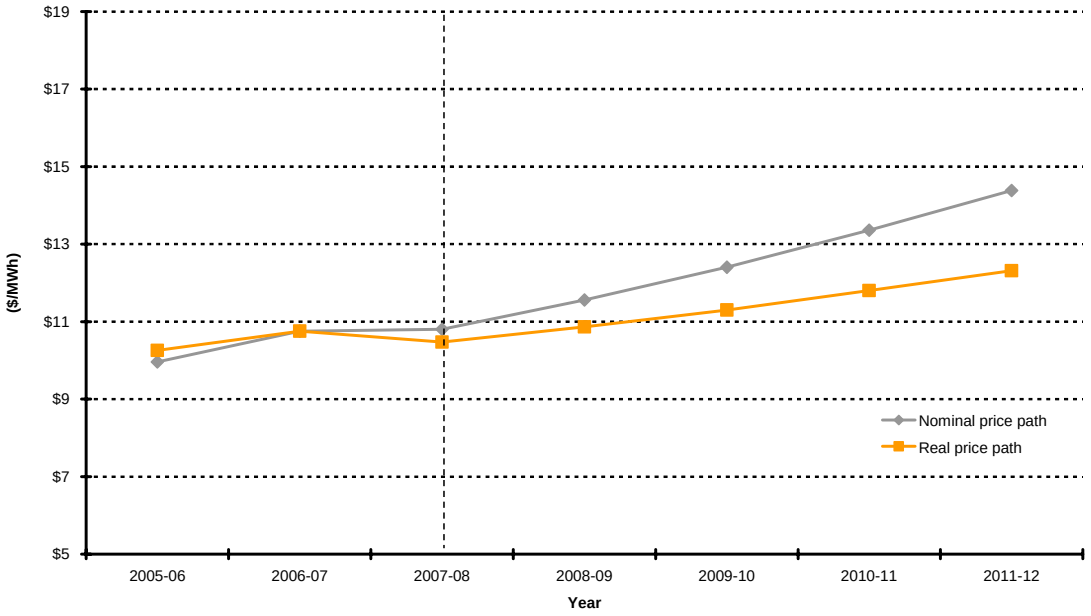
Based on the capex allowance in this decision, the change in the regulatory accounting methodology does not materially affect the average end user prices. The AER's revenue modelling indicates that the change in regulatory accounting methodology results in nominal transmission charges increasing on average by 6 per cent per annum over the next regulatory period whereas under the former regulatory accounting framework

[167] The forecast energy delivered figures were sourced from Powerlink's *2006 Annual Planning Report* (table 3.7, p. 34).

nominal transmission charges would have increased on average by 5.7 per cent per annum.

Figure 8.2 shows the resulting average price path of this decision during the next regulatory period compared with the average price for the final year of the current regulatory period (2006–07) in nominal and real terms. Nominal transmission charges are forecast to increase from around $10.80 per MWh in 2007–08 to $14.40 per MWh in 2011–12. Real transmission charges are forecast to increase from around $10.50 per MWh in 2007–08 to $12.30 per MWh in 2011–12. Transmission charges represent approximately 8 per cent on average of end user electricity charges in Queensland.

Figure 8.2 Price path from 2006–07 to 2011–12 ($/MWh)



Appendix A Review process

The following review process has been undertaken in assessing Powerlink's application.

3 April 2006	Powerlink submitted its revenue cap application to the Australian Energy Regulator (AER).
20 April 2006	The AER held a public forum on Powerlink's revenue cap application. Copies of the agenda, minutes and presentations are available on the AER's website.[168]
13 June 2006	Submissions on Powerlink's revenue cap application closed. Five submissions were received and are available on the AER's website.
30 August 2006	Powerlink provided a submission that responded to issues raised by the Energy Users Association of Australia (EUAA) in relation to its application.
10 November 2006	The AER received PB Associates' report which reviewed key elements of Powerlink's revenue cap application.
17 November 2006	The AER received Access Economics' report on the wage growth forecasts in the utilities sector.
8 December 2006	The AER made its draft decision. The draft decision and consultancy reports are available on the AER's website.
15 December 2006	Powerlink submitted a supplementary revenue cap proposal seeking an additional capex allowance based on updated information.
9 February 2007	Submissions on the AER's draft decision and Powerlink's supplementary revenue cap proposal closed. Fourteen submissions were received and are available on the AER's website.
16 February 2007	Powerlink provided a submission that responded to issues raised by Queensland Alumina Limited (QAL) in relation to the AER's draft decision.
6 March 2007	Powerlink provided a submission that responded to issues raised by the EUAA in relation to the AER's draft decision.
23 March 2007	The AER received PB Associates' report which reviewed key elements of Powerlink's supplementary revenue cap proposal.
30 March 2007	Powerlink submitted to the AER a report from NERA, commissioned by the Energy Networks Association, regarding an alleged bias in the observed yields of indexed Commonwealth government securities used as proxies for the real risk-free rate.
12 April 2007	The AER received Access Economics' report on revised wage growth forecasts.
12 April 2007	The AER received NERA's report on hedging costs for regulated businesses.
20 April 2007	Submissions on the alleged bias in the real risk-free rate, particularly on whether it could be addressed in time for the final decision, closed. Ten submissions were received and are available on the AER's website.
14 June 2007	The AER released its final decision. The final decision and consultancy reports are available on the AER's website

Copies of Powerlink's application and supplementary revenue cap proposal, consultancy reports and submissions are available on the AER's website.

168 http://www.aer.gov.au

Appendix B Submissions on draft decision

The following interested parties provided submissions on the AER's draft decision:

- Transend
- Energex
- Minister for Mines and Energy (Queensland)
- Department of Mines and Energy (Queensland)
- ElectraNet
- Ergon Energy
- Powerlink
- Queensland Alumina Limited
- Queensland Resources Council
- Sun Metals
- Townsville Enterprise
- TransGrid
- EnergyAustralia
- Energy Users Association of Australia.

The following interested parties provided submissions on the alleged bias with the real risk-free rate, particularly on whether this issue could be addressed in time for this decision:

- TransGrid
- Powerlink
- Transend
- Multinet
- Energy Networks Association
- SP AusNet
- Alinta
- ElectraNet
- EnergyAustralia
- Energy Users Association of Australia.

Appendix C Contingent projects and their triggers

This appendix sets out the drivers of the approved contingent projects, their scope and their triggers. Before commencing any assessment of the adjustment to be made to Powerlink's maximum allowed revenue (MAR) in relation to a contingent project, Powerlink will need to demonstrate to the AER's satisfaction that the relevant trigger event has occurred. Where the trigger event occurs, the proposed contingent project expenditure should not include the expenditure already included in Powerlink's ex ante allowance.

C.1 QNI upgrade (Queensland component)

The driver for this project is the benefit to the market from increasing the capacity of the Queensland–New South Wales Interconnector (QNI). The limits that cause the constraints to occur on QNI arise from a range of complex factors, including transient stability, oscillatory stability, voltage stability, and thermal limitations within both the Queensland and New South Wales networks.

The scope of the project involves the installation of series compensation, dynamic shunt compensation using static var compensators (SVCs) and power control equipment, and uprating the existing Armidale to Tamworth 330 kV circuit. Based on a pre-feasibility study, this upgrade would result in an increase of 150 to 200 MW to QNI's capacity.[169] Powerlink would undertake investment only on the section of the project relating to its network. The indicative cost of this project is $100 million.[170]

The trigger for this project is consistent with the ACCC's 2005 revenue cap decision for TransGrid which indicates that the project needs to be justified against the net market benefit limb of the regulatory test. [171]

C.2 Supply to Queensland Rail for rail link

The driver for this project is a decision by Queensland Rail to electrify a proposed track section connecting its northern and central coal haulage routes. Additional network investment would be required to extend the current electricity supply for this railway link. The scope of this project includes the development of substations in Newlands, Buckley, Collinsville and Goonyella and their associated easement acquisitions. The indicative cost of the project is $70 million.

The trigger for this project is a commitment by the Queensland Rail to proceed with the electrification of the proposed railway track connecting its northern and central coal haulage routes.

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169 Powerlink and TransGrid, *QNI upgrade: upgrade benefits—a pre-feasibility study: a report on outcomes of the planning process*, April 2005, p. 2.

170 Powerlink confirmed that the costs incurred during 2006-07 in relation to the evaluation of the QNI upgrade (CP.01125) should not be included as part of the proposed contingent project expenditure.

171 ACCC, *NSW and ACT transmission network revenue cap TransGrid 2004–05 to 2008–09*, April 2005, pp. 218-219.

C.3 Augmentation of supply to South East Queensland

The driver of this project is the early decommissioning of Swanbank B power station. In the probabilistic model, the decommissioning of Swanbank B generally occurs in 2011. Powerlink indicated that the early closure of Swanbank B would lead to voltage constraints in South East Queensland (SEQ) if there were no replacement generation. Powerlink stated that the closure of Swanbank B would require additional dynamic reactive power source in the Brisbane area.

The scope of the project includes two additional 350 MVAr SVCs in SEQ not included in the ex ante allowance. The indicative cost of this project is $50 million.

The trigger for this project is the closure of Swanbank B power station before 30 June 2011 without the establishment of replacement generation in SEQ.

C.4 Ebenezer 275/110 kV substation establishment

The driver for this project is a large industrial and commercial area flagged for future development in the Ipswich area, which has been included in the Energex Strategic Plan. The scope of the project includes the establishment of 275/110 kV substation, installation of two transformers, connection of two new 275 kV circuits to Greenbank and Blackwall, and establishment of 110 kV bus with one 110 kV transformer bay and two 110 kV feeder bays. The indicative cost of this project is $40 million.

The trigger for this project is an additional industrial load of 20 MW above the 2006 demand forecasts in the Ipswich area, which would result in an overload of the Energex network.

C.5 Nebo to Moranbah 275 kV line

Ergon Energy has provided information to Powerlink on anticipated load growth from major mining customers in the Bowen Basin area. This information indicated that mining expansions would continue for at least the next five years.

The driver for this project is an additional 50 MW mining load in the Bowen Basin area. The scope of this project is a 275 kV DCST transmission line between Nebo and Moranbah and associated substation works at Nebo. The indicative cost of this project is $90 million.

The trigger for this project is additional mining load of 50 MW above the 2006 demand forecasts in the Bowen Basin area, which has the affect of overloading the 132 kV supply network between Central and North Queensland. [172]

C.6 Nudgee establishment and 275 kV Nudgee to Murrarie line

The driver of this project is a decision to increase the reliability standard at Brisbane Airport to N–2. The possible scope of the project includes line works between Nudgee and Murarrie, and substation work at Belmont, Murrarie and Nudgee. The indicative cost of the project is $100 million.

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[172] It is noted that the annual planning report takes into account only committed mining loads known at the time of publication.

The trigger for this project is a change in reliability standard at Brisbane Airport to N–2, which has the effect of overloading the existing and planned transmission and sub-transmission networks supplying the Nudgee and Sandgate areas.

C.7 Desalination plant in South East Queensland

The driver for this project is a desalination plant at Tugun on the Gold Coast. The scope of the project includes advancing the 275/110 kV transformer at Mudgeeraba and the rebuild of the existing 275 kV single circuit line between Greenbank and Mudgeeraba to a high capacity double circuit line. The project has an indicative cost of $73 million.

The trigger for this project is final planning approval by the Gold Coast City Council for the development of a desalination plant in SEQ. To avoid any doubt, the proposed expenditure on the contingent project should not include the probability weighted expenditure already provided for in the ex ante allowance for the transformer at Mudgeeraba and high capacity double circuit line between Greenbank and Mudgeeraba.[173]

C.8 Gladstone major industrial development (M50++)

The driver for this project is a large industrial development in the Gladstone area with a load of between 250 MW and 1000 MW. The scope of the project includes the:

- construction of transmission lines from the Larcom Creek substation to industrial developments and Calvale
- establishment of Auburn River switching station
- installation of a capacitor bank in the Gladstone area
- refurbishment of the Calvale 275 kV substation
- works associated with the expansion of Larcom Creek substation from three bays to eight bays.

The indicative cost of this project is $170 million.

The trigger for the project is an additional 250 MW industrial load development in the Gladstone area that has not been included in the 2006 APR demand forecasts. The project scope must not include any projects already included in Powerlink's ex ante allowance. To avoid any doubt, the proposed expenditure on the contingent project should not include the expenditure on the Larcom Creek substation, which has already been included in the ex ante allowance.[174]

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173 Powerlink indicated that the probability weighted expenditure included in the ex ante allowance was $1.15 million for the Mudgeeraba transformer (CP.01543/A) and $10.46 million for the Greenbank to Mudgeeraba line (CP.01537).

174 Powerlink indicated that the probability weighted expenditure included in the ex ante allowance for the Larcom Creek substation (CP.01958) was $51.1 million.

C.9 Undergrounding costs

Powerlink's application includes 16 projects that contain limited sections of undergrounding. The specific details of these projects have not been included for confidentiality reasons. The AER will treat the undergrounding costs associated with these projects as contingent projects, unless the undergrounding is specifically required for technical reasons. For two of the 16 projects, undergrounding was required for technical reasons. The unweighted cost of the undergrounding associated with the remaining 14 projects is $233 million.

The trigger for any undergrounding costs is a legal, regulatory or administrative determination made by a relevant authority or Minister indicating that the granting of planning approval is contingent on the undergrounding. However, to avoid any delays to the projects, the AER will undertake an advanced assessment of undergrounding contingent projects and make its determination conditional. This process is discussed further in appendix E of the draft decision.

C.10 Additional desalination plant in South East Queensland

The driver for this contingent project is the possible need for additional desalination plants in SEQ (in addition to the Tugun desalination plant). The project's scope of works has not yet been established. The AER considers that if a further desalination plant proceeds in SEQ, Powerlink would need to demonstrate that the proposed expenditure does not include expenditure already included in its ex ante allowance.

The trigger for this project is a commitment by relevant authorities to construct further desalination plants (in addition to the Tugun desalination plant) in SEQ during the next regulatory period.

C.11 Significant change in generation pattern in Southern Queensland

The driver for this project is a significant change in generation pattern in Southern Queensland (SQ) because of drought or other factors. The change may result in materially larger transfers between South West Queensland (SWQ) and SEQ and result in the need to augment transmission capacity between these areas.

The scope of this project involves the advancement of a 500 kV development in Southern Queensland, with an indicative cost of $420 million.

The trigger for this project relates to the announcement of a significant change in generation pattern in SQ, which result in materially higher transfers between SWQ and SEQ and for which capex would be incurred before 30 June 2012. The actual trigger event is specified in the confidential version of this decision.

Appendix D Service standards scheme

This appendix replaces appendix F in the AER's draft decision. It sets out the AER's conclusions on Powerlink's service standards incentive scheme for the next regulatory period.

D.1 Performance measures and definitions

Powerlink's performance is to be assessed against the following performance measures:

- circuit availability:
  - peak circuit availability (between 7 am to 10 pm week days)
  - critical circuit availability (primarily the 275/330 kV network)
  - non-critical circuit availability (the 132/110 kV network and below)
- loss of supply events frequency:
  - events greater than 0.2 system minutes
  - events greater than 1.0 system minutes
- forced outage duration.

These measures are defined in tables D.1 to D.3, which appear on the following pages.

Table D.1 Measure 1—transmission circuit availability

Sub-measures	Transmission circuit availability (critical circuit elements). Transmission circuit availability (non-critical circuit elements). Transmission circuit availability (peak periods).
Unit of measure	Percentage of total possible hours available.
Source of data	TNSP outage reports and system for circuit availability. Agreed schedule of critical circuits and plant. Peak period—7:00 am to 10:00 pm weekdays excluding public holidays.* Off peak period—all other times.
Definition/formula	Formula: $\frac{\text{No. hrs per annum defined (critical/ non-critical/peak) circuits are available}}{\text{Total possible number of defined circuit hours}} \times 100$ Definition: The actual circuit hours available for defined (critical/non-critical peak) transmission circuits divided by the total possible defined circuit hours available. A critical circuit element is an element of the 330 kV network, the 275 kV interconnected network that forms the backbone of the transmission system and interconnections to other jurisdictions. All other circuits are non-critical.* Powerlink should submit a list of critical circuits/system components annually as part of the AER's compliance review.
Exclusions	Unregulated transmission assets (e.g. some connection assets). Any outages shown to be caused by a fault or other event on a '3rd party system' (e.g. intertrip signal, generator outage, customer installation). Force majeure events as per the *Service standards guidelines*. Any outage not affecting Powerlink's primary transmission equipment.* Faults originating from Powerlink owned equipment that affect primary plant or equipment owned by a distributor, connected customer or a generator.*
Inclusions	'Circuits' includes overhead lines, underground cables, power transformers, phase shifting transformers, static var compensators, capacitor banks, and any other primary transmission equipment essential for the successful operation of the transmission system but does not include individual circuit breakers and isolators or secondary systems.* Outages from all causes including planned, forced and emergency events, including extreme events.

* These items were not included in the original definitions of the *Service standards guidelines*.

Table D.2 Measure 2—loss of supply event frequency index

Sub-measures	Number of events greater than 0.2 system minutes per annum. Number of events greater than 1.0 system minutes per annum.
Unit of measure	Number of significant events per annum.
Source of data	TNSP outage reporting system.
Definition/formula	Number of events greater than 0.2 system minutes or 1.0 system minutes where: $\text{System minute} = \frac{\text{Customer outage duration (minutes)} \times \text{load lost (MW)}}{\text{System maximum demand (MW)}}$ Definition of system minute: The customer outage duration (in minutes) times the load lost (in megawatts) divided by the highest system maximum demand (in megawatts) that has occurred prior to the time of the event.*
Exclusions	Unregulated transmission assets (e.g. some connection assets). Any outages shown to be caused by a fault or other event on a '3rd party system' (e.g. intertrip signal, generator outage, customer installation). Planned outages. Force majeure events as per the *Service standards guidelines*.
Inclusions	All unplanned outages exceeding the specified impact (i.e. 0.2 system minutes and 1.0 system minutes). All parts of the regulated transmission system. Extreme events.

* These items were not included in the original definitions of the *Service standards guidelines*.

Table D.3 Measure 3—average outage duration

Unit of measure	Minutes.
Source of data	TNSP outage reporting system.
Definition/formula	Formula: $\frac{\text{Aggregate minutes duration of all unplanned outages}}{\text{Number of events}}$ Definition: The cumulative summation of the outage duration time for the period, divided by the number of outage events during the period. The start of each outage event is the time of the interruption of the first circuit element. The end of each outage event is the time that the last circuit element was restored to service.* The impact of each event is capped at 7 days.#
Exclusions	Planned outages. Momentary interruptions (duration of less than one minute). Force majeure events as per the Service Standards Guidelines.
Inclusions	Faults on all parts of the transmission system (connection assets, interconnected system assets). All forced and fault outages whether or not loss of supply occurs.

* These items were not included in the original definitions of the *Service standards guidelines*.
# The 7 day cap applied to Powerlink was based on SKM's original recommendations but was not included in the standard definitions.

D.2 Definition of force majeure

For the purpose of applying the service standards incentive scheme, 'force majeure events' means any event, act or circumstance or combination of events, acts and circumstances which (despite the observance of good electricity industry practice) is beyond the reasonable control of the party affected by any such event, which may include, without limitation, the following:

- fire, lightning, explosion, flood, earthquake, storm, cyclone, action of the elements, riots, civil commotion, malicious damage, natural disaster, sabotage, act of a public enemy, act of God, war (declared or undeclared), blockage, revolution, radioactive contamination, toxic or dangerous chemical contamination or force of nature

- action or inaction by a court, government agency (including denial, refusal or failure to grant any authorisation, despite timely best endeavour to obtain same)

- strikes, lockouts, industrial and/or labour disputes and/or difficulties, work bans, blockades or picketing

- acts or omissions (other than a failure to pay money) of a party other than the TNSP which party either is connected to or uses the high voltage grid or is directly connected to or uses a system for the supply of electricity which in turn is connected to the high voltage grid

- where those acts or omissions affect the ability of the TNSP to perform its obligations under the service standard by virtue of that direct or indirect connection to or use of the high voltage grid.

In determining what force majeure events should be 'Excluded force majeure events' the AER will consider the following:

- Was the event unforeseeable and its impact extraordinary, uncontrollable and not manageable?

- Does the event occur frequently? If so how did the impact of the particular event differ?

- Could the TNSP, in practice, have prevented the impact (not necessarily the event itself)?

- Could the TNSP have effectively reduced the impact of the event by adopting better practices?

D.3 Calculation of performance

The following tables and figures represent the scale of the financial penalty or reward (y–axis) resulting from Powerlink's performance measure of circuit availability (x–axis). Tables D.4 to D.9 show the set of linear equations represented in figures D.1 to D.6.

The final s-factor result for each calendar year should be determined by the following formula:

$$S_{ct} = S_1 + S_2 + S_3 + S_4 + S_5 + S_6$$

where:

S_{ct} = the total service standards factor (s-factor)

ct = the time period/calendar year

S_1 = s-factor for peak circuit availability

S_2 = s-factor for critical circuit availability

S_3 = s-factor for non-critical circuit availability

S_4 = s-factor for loss of supply events greater than 0.2 system minutes

S_5 = s-factor for loss of supply events greater than 1.0 system minutes

S_6 = average outage duration.

Figure D.1 Circuit availability—critical elements

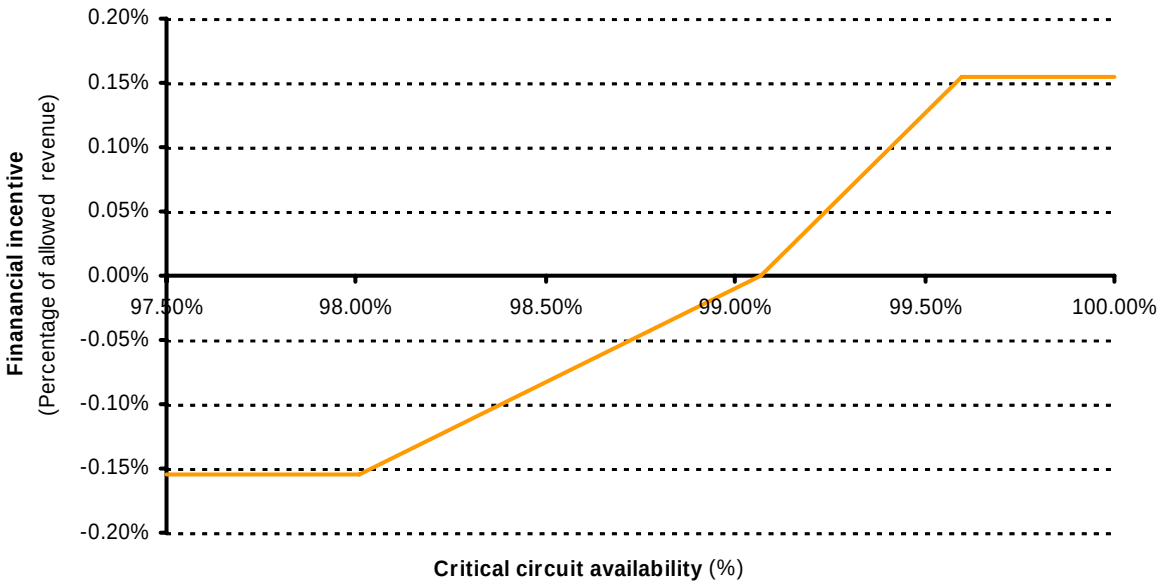

Table D.4 Circuit availability—critical elements

							Where:					
S1	=	–0.00155							Availability	<	98.01%	
S1	=	0.146226	x	Availability	+	–0.144867	98.01%	≤	Availability	≤	99.07%	
S1	=	0.292453	x	Availability	+	–0.289733	99.07%	≤	Availability	≤	99.60%	
S1	=	0.001550					99.60%	<	Availability			

Figure D.2 Circuit availability—non-critical elements

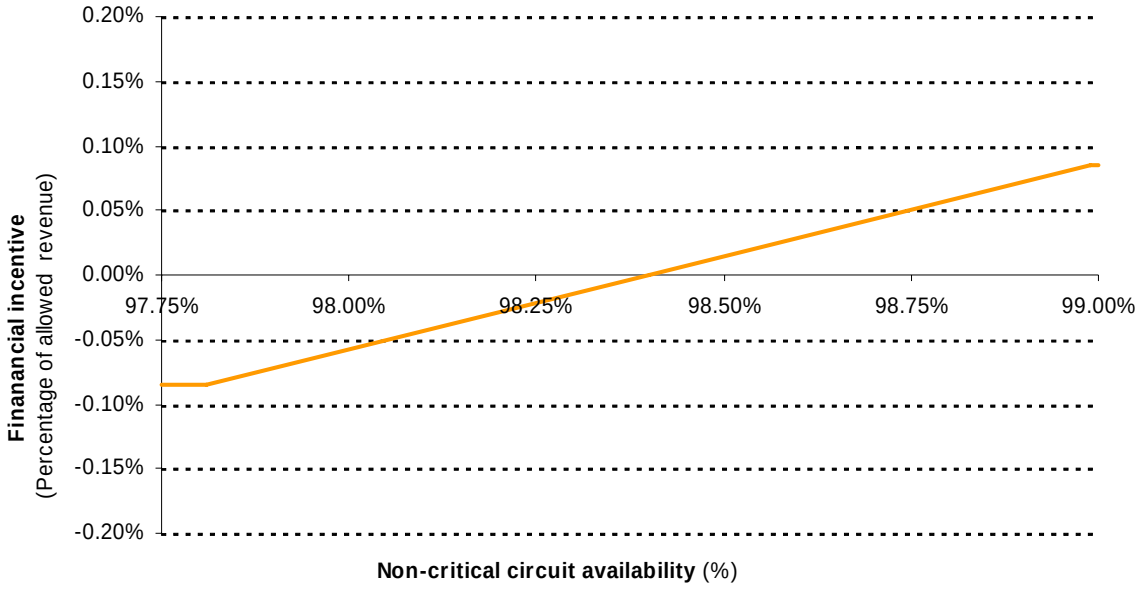

Table D.5 Circuit availability—non-critical elements

							Where:					
S2	=	–0.000850							Availability	<	97.81%	
S2	=	0.144068	x	Availability	+	–0.141763	97.81%	≤	Availability	≤	98.40%	
S2	=	0.144068	x	Availability	+	–0.141763	98.40%	≤	Availability	≤	98.99%	
S2	=	0.000850					98.99%	<	Availability			

Figure D.3 Circuit availability—peak hours

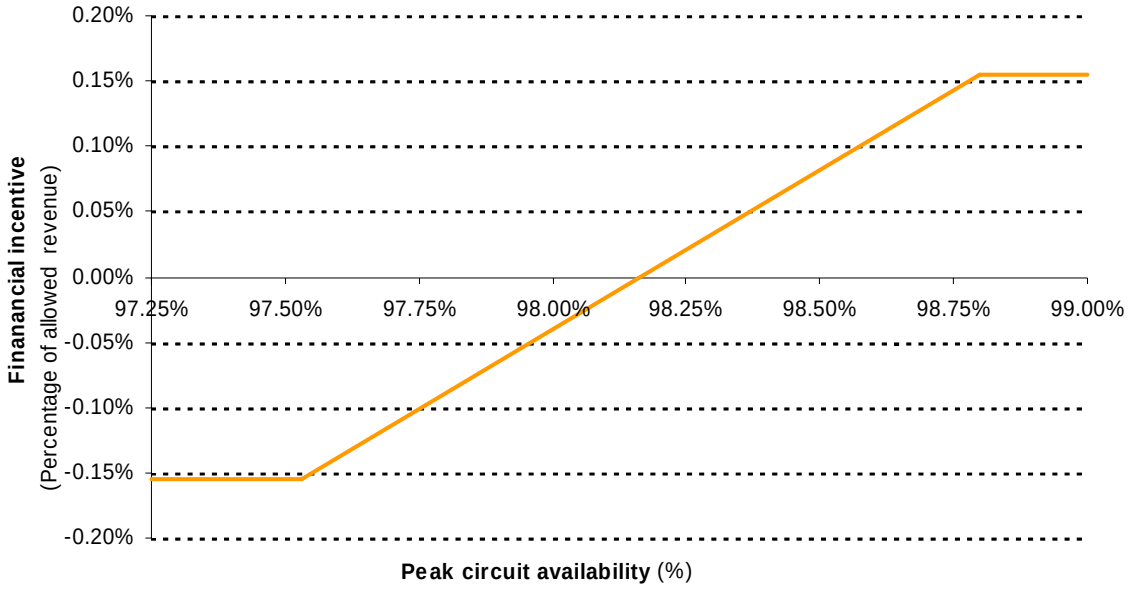

Table D.6 Circuit availability—peak hours

						Where:					
S3	=	–0.001550						Availability	<	97.53%	
S3	=	0.246032	x	Availability	+	–0.241505	97.53%	≤	Availability	≤	98.16%
S3	=	0.242188	x	Availability	+	–0.237731	98.16%	≤	Availability	≤	98.80%
S3	=	0.001550					98.80%	<	Availability		

Figure D.4 Loss of supply event frequency > 0.2 minutes

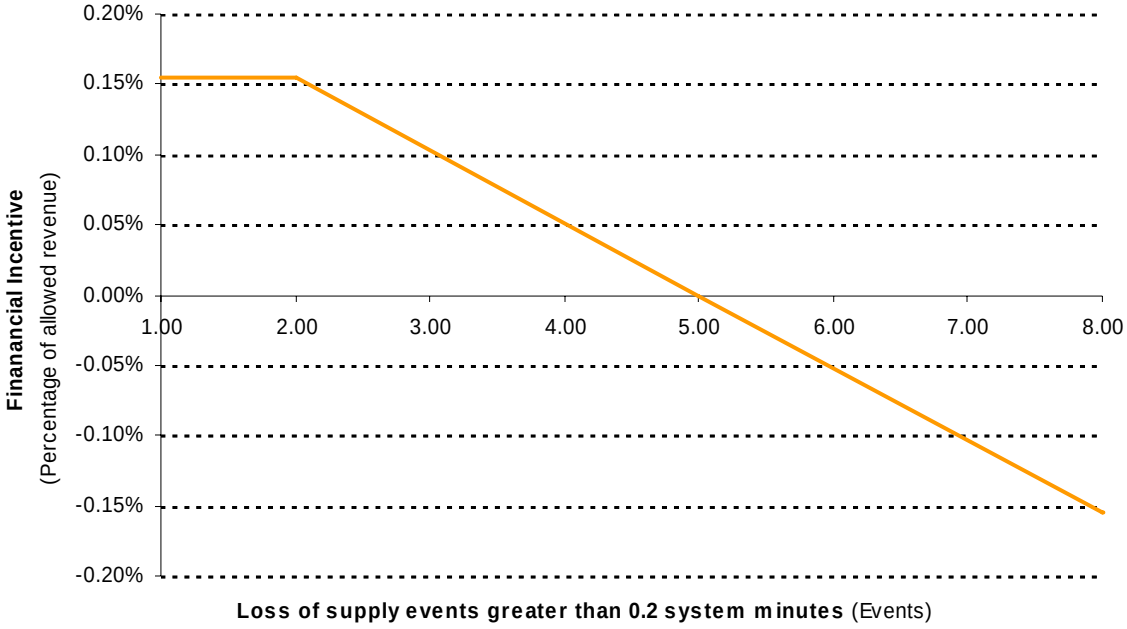

Table D.7 Loss of supply event frequency > 0.2 system minutes

							Where:					
S4	=	–0.001550					8.0	<	No. of events			
S4	=	–0.000517	x	No. of events	+	0.002583	5.0	≤	No. of events	≤	8.0	
S4	=	–0.000517	x	No. of events	+	0.002583	2.0	≤	No. of events	≤	5.0	
S4	=	0.001550							No. of events	<	2.0	

Figure D.5 Loss of supply event frequency > 1.0 system minutes

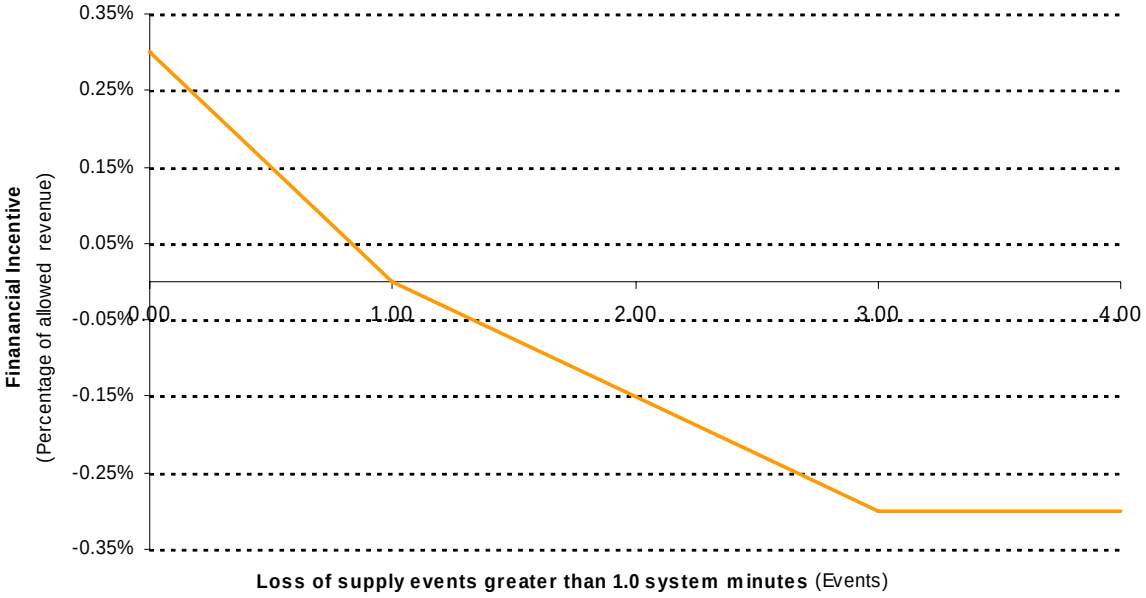

Table D.8 Loss of supply event frequency > 1.0 system minutes

							Where:				
S5	=	–0.003000					3.0	<	No. of events		
S5	=	–0.001500	x	No. of events	+	0.001500	1.0	≤	No. of events	≤	3.0
S5	=	–0.003000	x	No. of events	+	0.003000	0.0	<	No. of events	≤	1.0
S5	=	0.003000							No. of events	=	0.0

Figure D.6 Average outage duration

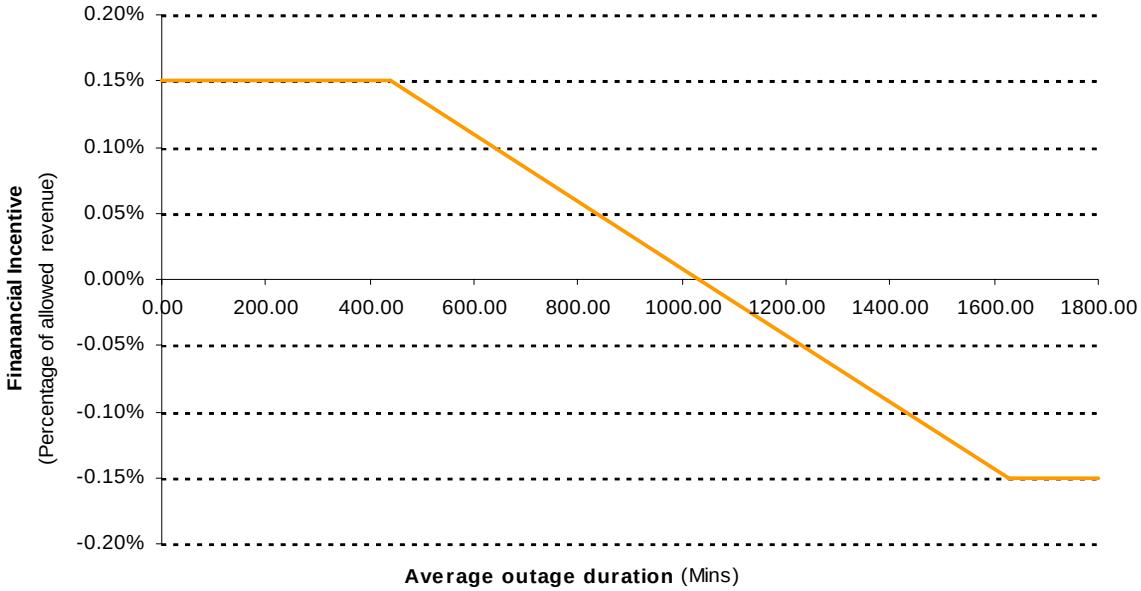

Table D.9 Average outage duration (capped at 7 days)

							Where:					
S6	=	–0.001500					1627	<	Average outage duration			
S6	=	–0.000003	x	Average outage duration	+	0.002609	1033	≤	Average outage duration	≤	1627	
S6	=	–0.000003	x	Average outage duration	+	0.002609	439	≤	Average outage duration	≤	1033	
S6	=	0.001500							Average outage duration	<	439	

D.4 Calculation of the financial incentive

The financial incentive applied to Powerlink's allowed revenue (AR) can be found by multiplying Powerlink's average AR by the total s-factor result. This may result in a positive (or negative) financial bonus (or penalty) depending on Powerlink's performance over the relevant calendar year. The financial incentive is included in the maximum allowed revenue (MAR) for the financial year immediately following the relevant calendar year. The financial incentive and MAR formulae are set out in chapter 8 of this decision.

D.5 Annual reporting

In accordance with clause 6.2.5 of the old rules and the *Service standards guidelines*, Powerlink must record and report all performance measures annually on a calendar year basis. All reporting should be in accordance with the information requirements as outlined in the guidelines and the supplementary information guidelines below.

D.6 Supplementary information requirements

Information for annual compliance

Powerlink must report the following service performance information to the AER by 1 February each year:

- Actual service performance results for the previous calendar year as measured against the performance measure definitions in section D.1 of this appendix. Powerlink must report its performance both with and without any proposed exclusions.

- A list of events that Powerlink considers should be excluded from performance results, and for each event:

  - a description of the event

  - a description of the impact of the event

  - a quantification of the impact of the event on the network and service performance[175]

  - reasons why the event should be excluded and how it meets any relevant exclusion definition

  - for force majeure events, an analysis of how the definition meets the definition of force majeure in the section D.1 of this appendix

  - for third party events, a description of where and how the event occurred and who is responsible for the event

  - where available, provide supporting documentation for the event.[176]

- The primary drivers of performance in the present calendar year, including reasons for any significant changes in performance from the previous calendar year.

- Powerlink's proposed service standards factor (s-factor) and financial incentive calculated in accordance with section D.3 of this appendix and the *Service standards guidelines*. Powerlink must report the value of the s-factor and financial incentive both before and after any proposed exclusions.

- A list of the current criteria for any aspect of Powerlink's performance measures that are defined by Powerlink and subject to change during the regulatory period (e.g. some definitions of critical and non-critical circuits or peak and off-peak periods may change within a regulatory period).

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175 For example, impact on the network may be measured in time, energy undelivered or any other relevant unit of measure.

176 Supporting documentation may include external reports and information which indicate the impact of an event.

Templates and performance reports

The AER will provide Powerlink with a customised service performance reporting template by 15 December each year. Powerlink must use this template to report relevant service performance information to the AER.

Powerlink's service performance reporting template will be customised to allow for the differences in the performance measures, weightings and values that apply to Powerlink.

The AER will provide guidance on how to complete the customised service performance reporting template.

The AER will update Powerlink's reporting template annually to:

- account for changes in the performance measures or values that apply to it
- account for changes in the variables which affect the calculation of the financial incentive (e.g. changes to CPI inputs)
- update references to the correct reporting period and financial year.

The AER will consult with Powerlink when making these changes.

Powerlink must report any service performance information:

- that is required by the *Service standards guidelines* but is not provided for in the service performance reporting template
- additional supporting information
- in a separate performance report—Powerlink must prepare this performance report and submit it to the AER with Powerlink's service performance reporting template.

Compliance review

The *AER* will conduct an annual review of the service performance information in accordance with the *Service standards guidelines*.

Publication and disclosure of information

The AER intends to publish all relevant information from the compliance review process on the AER's website. Powerlink should advise the AER of any confidentiality claims when submitting any service performance information.

The AER will release an annual summary of Powerlink's service performance results in the AER's annual regulatory report.

Table D.10 sets out the timetable for Powerlink's service standards incentive reporting.

Table D.10 Timing of Powerlink's service standards incentive reporting

Performance reporting period	Period	Financial incentive applied to AR
1 July 2007–31 December 2007	6 months	1 July 2008–30 June 2009
1 January 2008–31 December 2008	1 year	1 July 2009–30 June 2010
1 January 2009–31 December 2009	1 year	1 July 2010–30 June 2011
1 January 2010–31 December 2010	1 year	1 July 2011–30 June 2012
1 January 2011–31 December 2011	1 year	1 July 2012–30 June 2013
1 January 2012–30 June 2012	6 months	1 July 2013–30 June 2014

D.6 Change in recording or reporting systems

Powerlink is required to notify the AER in the event of any material change in the information systems used to record information relating to the service standards scheme.